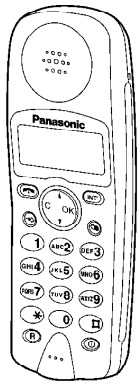
ORDER NO. KM40007640A2

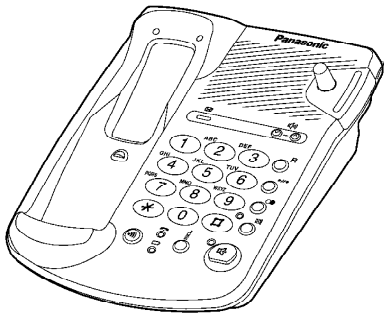
Telephone Equipment

KX-TCD953GRB

Digital Cordless Phone (for Greece)



(HANDSET)



(BASE UNIT)

SPECIFICATIONS

SPECIFICATION

Standard:	DECT–Digital Enhanced Cordless Telecommunications GAP=Generic Access Profile (herstellerubergreifendes DECT-Funkubertragungs verfahren)	Battery life, Handset (if batteries are fully charged):	Stand-by: Up to 65 hours (Ni-Cd) Talk: Up to 6 hours (Ni-Cd)
Number of channels:	120 Duplex Channels	Operating conditions:	5˚ - 40˚C, 20 - 80% relative air humidity (not condensing)
Frequency range:	1.88 GHz to 1.9 GHz	Dialing modes:	Pulse/Tone
Duplex procedure:	Time Multiplex, 10 ms frame length	Recall button (set default):	Flash (80 ms)
Channel Spacing:	1728 kHz	for PBX:	Flash (700 ms)
Bit rate spacing:	1152 kbit/s	Recall button (option):	Earth (400 ms/1300 ms)
Modulation:	GFSK	Dimensions, Base unit:	approx 201 mm x 171 mm x 73 mm (L x W x D)
Voice coding:	32 kbit/s	Dimensions, Handset:	approx 160 mm x 56 mm x 32 mm (L x W x D)
Operation range:	Up to 300 m outdoors, up to 50 m indoors	Weight, Base unit:	approx 460 g
Analog telephone connection:	Telephone Line / PBX	Weight, Handset:	approx 150 g
Power source:	AC Adaptor 230 V ~ /50 Hz	Telephone line cord length:	approx 2.1 m
Power consumption, Base unit:	5 VA	AC adaptor cord length:	approx 2 m
		Connection jack:	
		AC adaptor cord:	Modular jack 6/4
		AC adaptor cord:	Euro Jack

Design and specification are subject to change without notice.

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

When you mention the serial number, write down all 11 digits. The serial number may be found on the label affixed to the bottom of the unit.

FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.
When repairing, the following precautions will help prevent recurring malfunctions.
1. Cover plastic parts boxes with aluminum foil.
2. Ground the soldering irons.
3. Use a conductive mat on worktable.
4. Do not grasp IC or LSI pins with bare fingers.

Panasonic

1. LOCATION OF CONTROLS

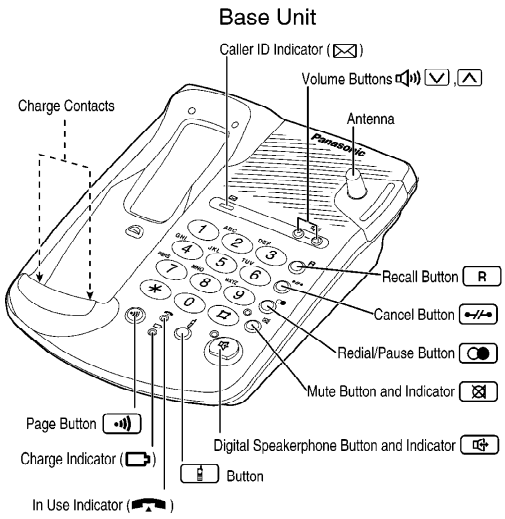


Fig. 1

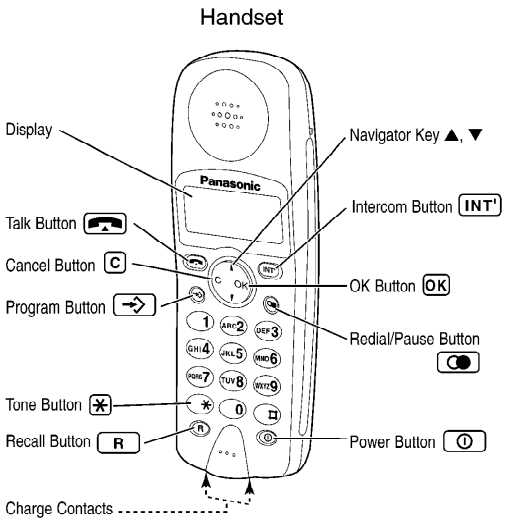
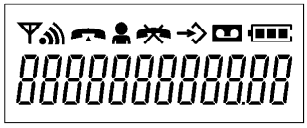


Fig. 2

Display



Icons:

	The in range icon indicates that the handset is in range of the base unit. It flashes when the handset is out of range.
	The page/intercom icon is displayed when paging or using the intercom. It flashes when another unit pages the handset.
	The talk icon is displayed when making or answering calls. It flashes when an outside call is being received.
	The direct call icon is displayed when this mode is turned on.
	The call prohibition icon is displayed when this mode is turned on.
	The program icon indicated that the unit is in the programming mode.
	The battery icon indicates the battery strength.

Characters:

P	is pressed while dialing.		is pressed while dialing.
F	R is pressed while dialing.		is pressed while dialing.

2. DISASSEMBLY INSTRUCTIONS

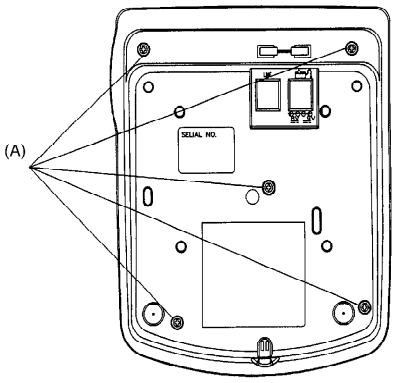


Fig. 3

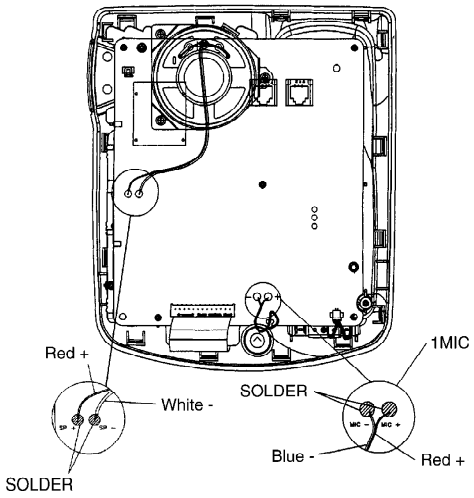


Fig. 4

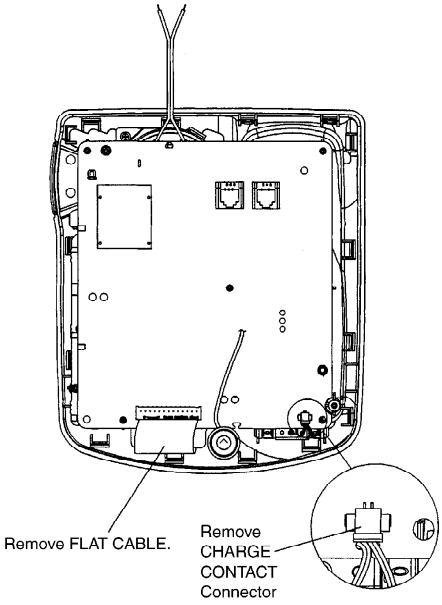


Fig. 5

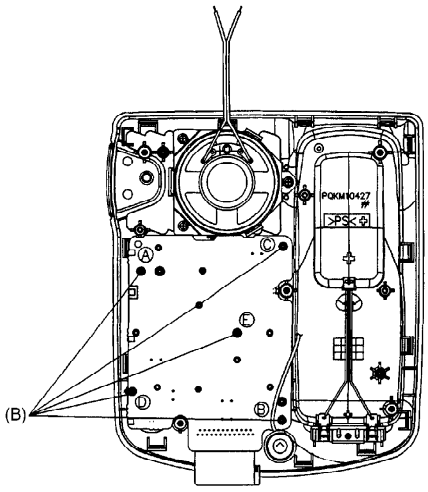


Fig. 6

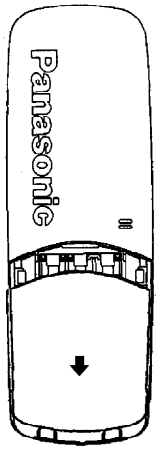


Fig. 7

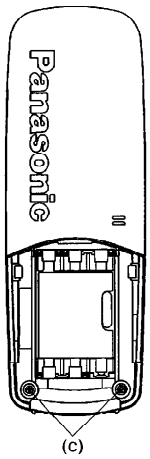


Fig. 8

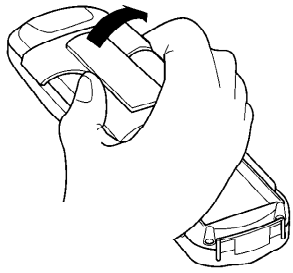


Fig. 9

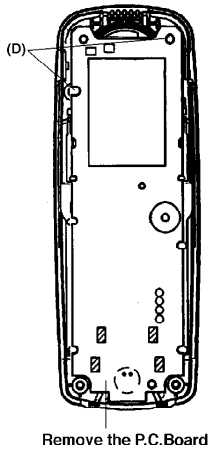


Fig. 10

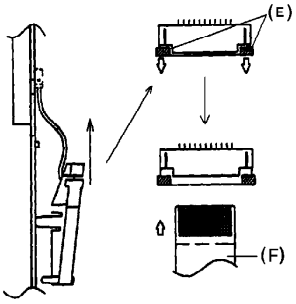


Fig. 11

Ref No.	Procedure	Shown in Fig.	To Remove	Remove
1	1	3	Lower Cabinet	Screws (2.6 × 14) ..... (A) ×5
2	2	4	SOLDER	Remove the SOLDER
3	3	5	P.C. Board	Remove the P.C. Board
4	4	6	Operational P.C. Board	Screws (2.6×8) ..... (B) ×5
5	5	7	Battery Cover	Remove the Battery Cover
6	5, 6	8, 9	Rear Cabinet	Screws (2.6×10) ..... (C) ×2
7	4~7	10	P.C. Board	Screws (2.6×10) ..... (D) ×2
8	4~8	11	LCD Lead	Pull the Connector Locks ..... (E) ×2
9	4~9			Pull the LCD Lead ..... (F) ×1

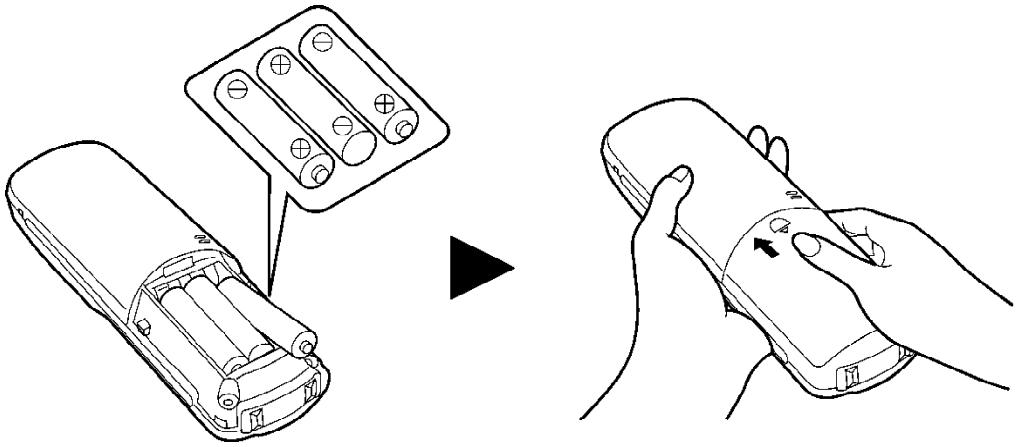
When removing the rear cabinet, attach the belt clip and press the belt clip as direction arrow. (Fig. 9)

3. SETTINGS

3.1. INSTALLING THE BATTERIES IN THE HANDSET

Install the batteries as shown. Then install the handset cover.

Fig. 12

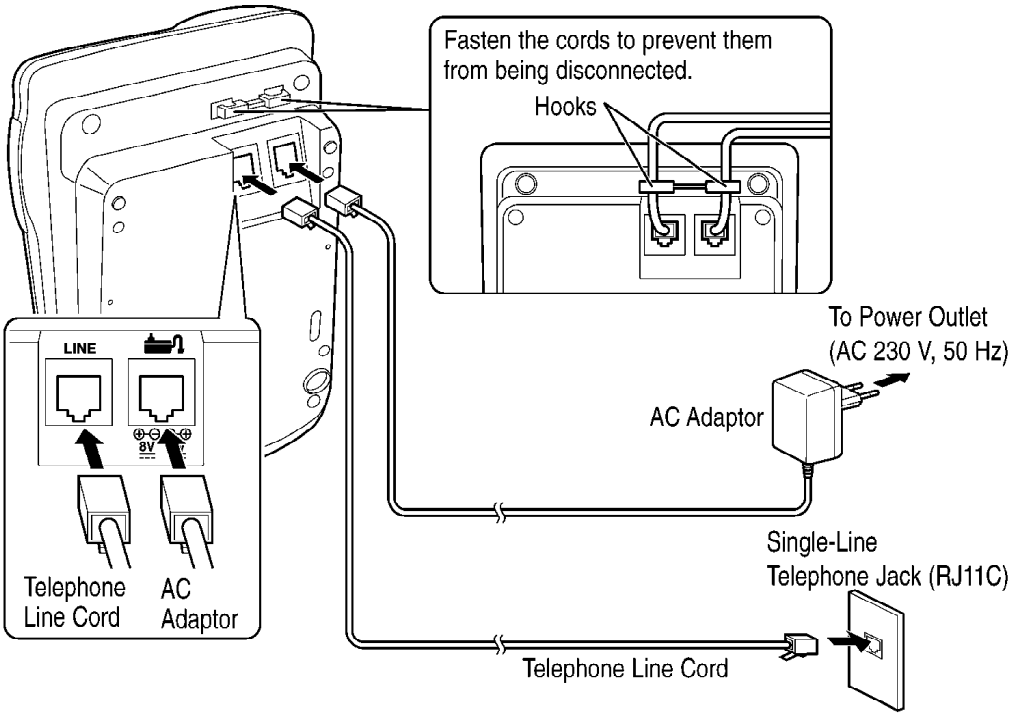


- **If the rechargeable batteries are not inserted correctly, the handset will not work.**

3.2. CONNECTION

Plug in the AC adaptor cord and the telephone line cord to the bottom of the unit. Then connect the cords as shown.

Fig. 13



- **USE ONLY WITH Panasonic AC ADAPTOR KX-TCA11CE.**
- **Be careful not to confuse the telephone line jack with the AC adaptor jack on the base unit. If connected improperly, the base unit will not work and damage may occur.**
- **The AC adaptor must remain connected at all times. (It is normal for the adaptor to feel warm during use.)**
- **If your unit is connected to a PBX which does not support Caller ID**

services, you cannot access those services.

CAUTION:

Please use only the telephone line cord that is supplied with the unit, following the labels that shows which end you will connect to the unit and which to the telephone line. The end that is connected with the unit shows “TELEPHONE” and the end that is connected with the telephone line shows “LINE”. / If you connect the cable upside down, the unit will not work. The same will happen if you use another cable for connection. If you don't have the socket that the above picture illustrates for the plug type RJ11C, then we recommend that the correct socket is installed by an authorised technician. (Note: This type of socket is also provided in the Telecommunication stores of the PTT.) Otherwise, you can obtain a suitable adaptor from any store with electronic goods, for converting the RJ11C cable, according to your needs.

3.3. BATTERY CHARGE

At the time of shipment, the batteries are not charged. To charge, place the handset on the base unit. Please charge the batteries for about 4 hours before initial use.

•The charge indicator ( ) lights.

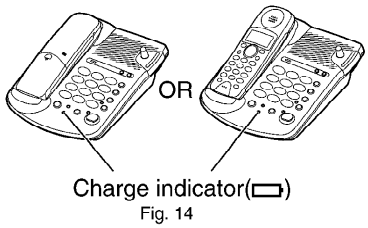


Fig. 14

Battery strength

You can check the present battery strength on the display.

Battery icon	Battery strength
	Fully charged
	Medium
	Low
(Flashing)	No power

Recharge

When " " flashes or the unit beeps every 15 seconds, recharge the batteries.

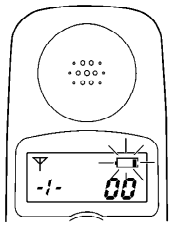


Fig. 15

Battery Information

After your Panasonic batteries are fully charged:

Operation	Approx. Ni-Cd battery life (included)	Approx. Ni-MH battery life (optional)*
While in use (Talk)	Up to about 6 hours	Up to about 12 hours
While not in use (Stand-By)	Up to about 65 hours	Up to about 130 hours

- Battery life may be shortened depending on usage conditions, such as:
  -When viewing the Caller ID Caller List, and
  -Ambient temperature.
- **Clean the handset and the base unit charge contacts with a soft, dry cloth.**
  Clean if the unit is subject to grease, dust or high humidity. Otherwise the batteries may not charge properly.
- If the batteries are fully charged, you do not have to place the handset on the base unit until " " flashes.
  This will maximse the battery life.
- The batteries cannot be overcharged.

* Nickel metal hydride (Ni-MH) rechargeable batteries (AAA size) are available.
When you replace the batteries, you must program the battery type selection.

3.4. INSTALLING THE HANDSET CLIP

You can hang the handset on your belt or pocket using the belt clip.

Fig. 16

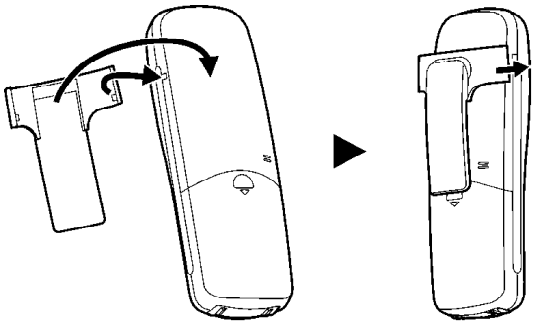
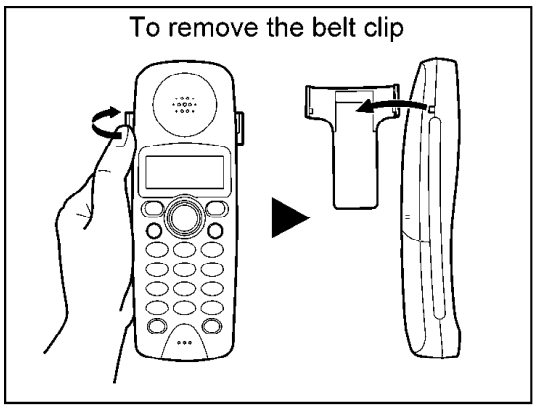


Fig. 17



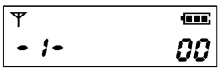
4. OPERATIONS

4.1. SETTINGS

4.1.1. TURNING THE POWER ON

Press ⏻ firmly.

- After all possible configurations briefly appear, the display will change to the following. Then the handset is in the stand-by mode.
  The current connected base unit number is displayed.



- You can choose whether to display the base unit number, handset number or no display in the stand-by mode by programming.

To turn the power OFF, press and hold ⏻ until a beep sounds.

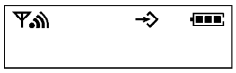
- The display will go blank.
- The handset will not ring.

- Depending on the programming mode, you may not be able to turn the power off. First make sure the handset is set to the stand-by mode.

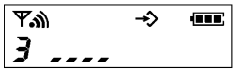
4.1.2. SELECTING THE DIALING MODE

You can program the dialing mode to tone or pulse. If you have touch tone service, set to tone. If rotary or pulse service is used, set to pulse. The factory preset is tone. Make sure that the power is ON and the unit is in the stand-by mode.

1 **Press** [→] **then** [INT'].



2 **Press** [3].



3 **Enter the base unit password.**

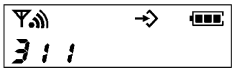
- The factory preset is 0000.

4 **Press** [1].

- The current mode is displayed.

1: Tone **2:** Pulse

Ex. Tone is selected.



5 **To select Pulse, press** [2].
OR
To select Tone, press [1].

6 **Press** [→].

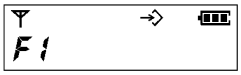
- A confirmation tone sounds and the display will return to the stand-by mode.

- If 5 beeps sound in step 3, the entered password is incorrect. Enter the correct password.
- To cancel during programming, press [→], then start from step 1.

4.1.3. SELECTING THE HANDSET RINGER VOLUME

6 levels are available. The lowest level is 1.
The highest level is 6. The factory preset is 3.
When set to OFF, the handset will not ring.

1 Press [→].

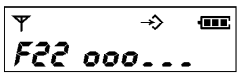


2 Press ▼ or ▲ until " F22 "is displayed.

3 Press [OK].

- The current volume is displayed and rings.

Ex. Level 3 is selected.



4 Press ▼ or ▲ to select the desired level.

- Each time you press a button, the selected volume is displayed and rings.
- To set to OFF, erase " ▫ " by pressing ▼ until " bELL OFF " is displayed.

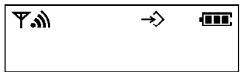
5 Press [→].

- A confirmation tone sounds and the display will return to the stand-by mode.
- When set to OFF, " bELL OFF " will be displayed.

4.1.4. SELECTING THE BASE UNIT RINGER VOLUME

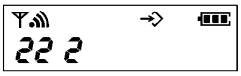
3 levels (HIGH, MEDIUM, LOW) are available.
The factory preset is MEDIUM. When set to OFF, the base unit will not ring. **Make sure that the power is ON and the unit is in the stand-by mode.**

1 Press → then INT'.



2 Press 2 TWICE.
- The current volume is displayed.
  1: LOW **2:** MEDIUM **3:** HIGH **0:** OFF

Ex. MEDIUM is selected.



3 Press the desired volume level 1 , 2 , 3 or 0.
- Each time you press a button, the selected volume is displayed and rings.

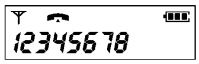
4 Press →.
- A confirmation tone sounds and the display will return to the stand-by mode.

4.2. MAKING CALLS

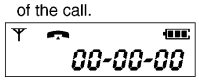
4.2.1. HOW TO MAKE CALLS

1 Press .

2 Dial a phone number.
- The dialed number is displayed.



- After a few seconds, the display will start showing the length of the call.



3 To hang up, press or place the handset on the base unit.
- The handset will return to the stand-by mode.

4.2.2. TO DIAL AFTER CONFIRMING THE ENTERED NUMBER

1 Enter a phone number.
- The entered number is displayed.
- If you misdial, press C. Digits are erased from the right.
- To cancel, press C firmly.

2 Press .
- After a few seconds, the display will start showing the length of the call.

3 To hang up, press or place the handset on the base unit.
- The handset will return to the stand-by mode.
- If " " flashes and an alarm tone sounds after pressing , move closer to the base unit. Then try again.
- If busy tones sound after pressing to make a call, the base unit speakerphone or another handset is in use.
- You can choose whether to display the length of the call or phone number in the talk mode by programming.

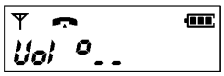
4.2.3. TO SELECT THE RECEIVER VOLUME

3 levels (HIGH, MEDIUM, LOW) are available.
The factory preset is MEDIUM.

While talking, press ▼ or ▲ to select the desired level.

• The display shows the volume level.

Ex. LOW is selected.



• After a few seconds, the display will return to the length of the call.

OR

In the stand-by mode, proceed as follows.

1 Press [→].

2 Press ▼ or ▲ until " F6 " is displayed, then press [OK].

• The current level is displayed.
Ex. LOW is selected.

3 Press ▲ or ▼ to select the desired level.

4 Press [→].

4.2.4. TO REDIAL THE LAST NUMBER DIALED

Press [↩] ➡ [⏺].

• The last number dialed is automatically redialed.

4.2.5. TO REDIAL AFTER CONFIRMING THE NUMBERS IN REDIAL MEMORY

The unit automatically stores the last 10 numbers dialed into redial memory.

1 **Press** [⏺]
• The last number dialed is displayed.

2 **Select the desired number by pressing** [⏺].
• You can also search from the most recent to oldest number by pressing ▼. To search from the oldest to most recent number, press ▲.
• "▬▬▬▬▬▬▬▬▬▬" denotes the end of redial memory.
• To exit the list, press [C] firmly.

3 **Press** [↩]
• The number is dialed automatically.
• It your line has rotary or pulse service, any access numbers entered after pressing [✱] will not be included when redialing.

4.2.6. TO CLEAR ALL OF THE NUMBERS IN THE REDIAL MEMORY

1 **Press** [→].

2 **Press ▼ or ▲ until "F9" is displayed, then press** [OK].

3 **Press** [→].
• A confirmation tone sounds and the display will return to the stand-by mode.

4.2.7. WITH THE BASE UNIT (Digital Speakerphone)

1 **Press** [ ].
- The indicator lights.

2 **Dial a telephone number.**
- If you misdial, press [ ] then dial again.

3 **When the other party answers, talk into the MIC.**

4 **To hang up, press** [ ].
- The indicator light goes out.

- The base unit speaker phone cannot be used while a handset is in use. Wait until the in use indicator ( ) goes out.

4.2.8. To adjust the speaker volume (8 levels)

To increase, press [ ].
To decrease, press [ ].

To redial the last number dialed on the baseunit

Press [ ] ➡ [ ].

4.2.9. HANDS-FREE DIGITAL SPEAKERPHONE

The digital speakerphone enhances your telephone conversation.

For best performance, please note the following.

- Use the speakerphone in a quiet room.
- Speak alternately with the caller.
- If the caller complains that your voice is hard to hear, press [ ] to decrease the speaker volume.
- If the other party's voice from the speaker cuts in/out during a conversation, press [ ] to decrease the speaker volume.

4.2.10. Mute your conversation

Press [ ] while talking. (The mute indicator ( ) lights.)

- The other party cannot hear your voice but you can hear theirs.
- To resume the conversation. Press [ ] again.

4.3. ANSWERING CALL

Make sure that the power is ON, otherwise the handset will not ring.

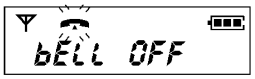
4.3.1. WITH THE HANDSET

If the handset is off the base unit, press [ ].
- You can also answer a call by pressing any dialing button [0] to [9], [*] or [#].
- The handset and base unit will not ring if both ringer volumes are set to OFF.

4.3.2. TO TURN THE HANDSET RINGER OFF TEMPORARILY

When the handset starts ringing, press ▼ firmly.

- " bELL OFF " is displayed and the handset stops ringing.



- The ringer will turn back on for the next call.
- This function will not work when the handset is on the base unit.

4.3.3. AUTO TALK

If you set the Auto talk feature to ON, you can answer a call by lifting the handset off the base unit without pressing .

4.3.4. WITH THE BASE UNIT

1 Press .

2 Talk into the MIC.

3 To hang up, press .

5. BLOCK DIAGRAM BASEBAND SECTION AND LINE INTERFACE (BASE UNIT)

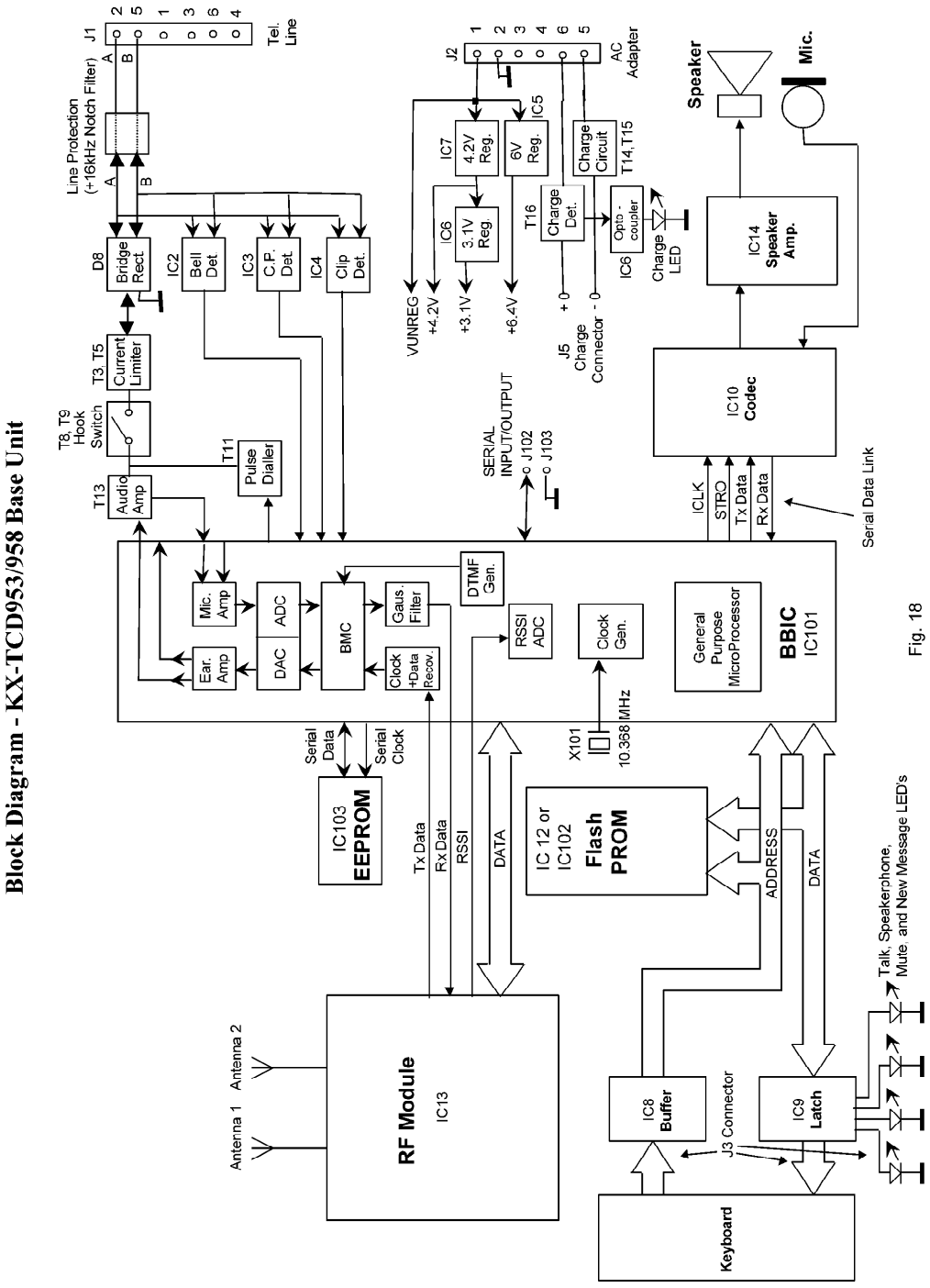


Fig. 18

6. CIRCUIT OPERATION (BASE UNIT)

6.1. THE BASE-BAND SECTION (SEE BLOCK DIAGRAM Fig. 18)

6.1.1. INTRODUCTION

The base-band section consists of a base-band integrated circuit (BBIC), a Flash PROM and an EEPROM.

6.1.2. THE BASE-BAND INTEGRATED CIRCUIT (BBIC)

The PQVINSC14424 (IC101) is a CMOS device designed to handle all the audio, signal and data

processing needed in a DECT base unit. It contains a "burst mode controller" microprocessor which takes care of DECT specific physical layer and radio section control. It also contains two ADPCM transcoders, a low power 14 bit codec (ADC/DAC), various other ADC´s, DAC´s and timers, a gaussian filter for the DECT GFSK modulation method, clock and data recovery circuits, a clock oscillator circuit, a DTMF generator (DSP), an echo suppression circuit (DSP), and a pair of gain controllable audio amplifiers for line input and line output and a general purpose microcontroller. / The IC101 interfaces to its external PROM (IC102) via a data/address/ control bus. It connects to the EEPROM via a serial interface, and a second serial interface is used during manufacture and service to connect to an external computer.

6.1.3. FLASH PROM (SEE Fig. 19)

The 2 Mbit (IC102) Flash PROM contains the operational firmware for the microcontroller. It is interfaced to the data/address/control bus using address lines A0 to A16, data lines D0 to D7, and chip select (pin 30), output enable (pin 32), and write (pin 7).

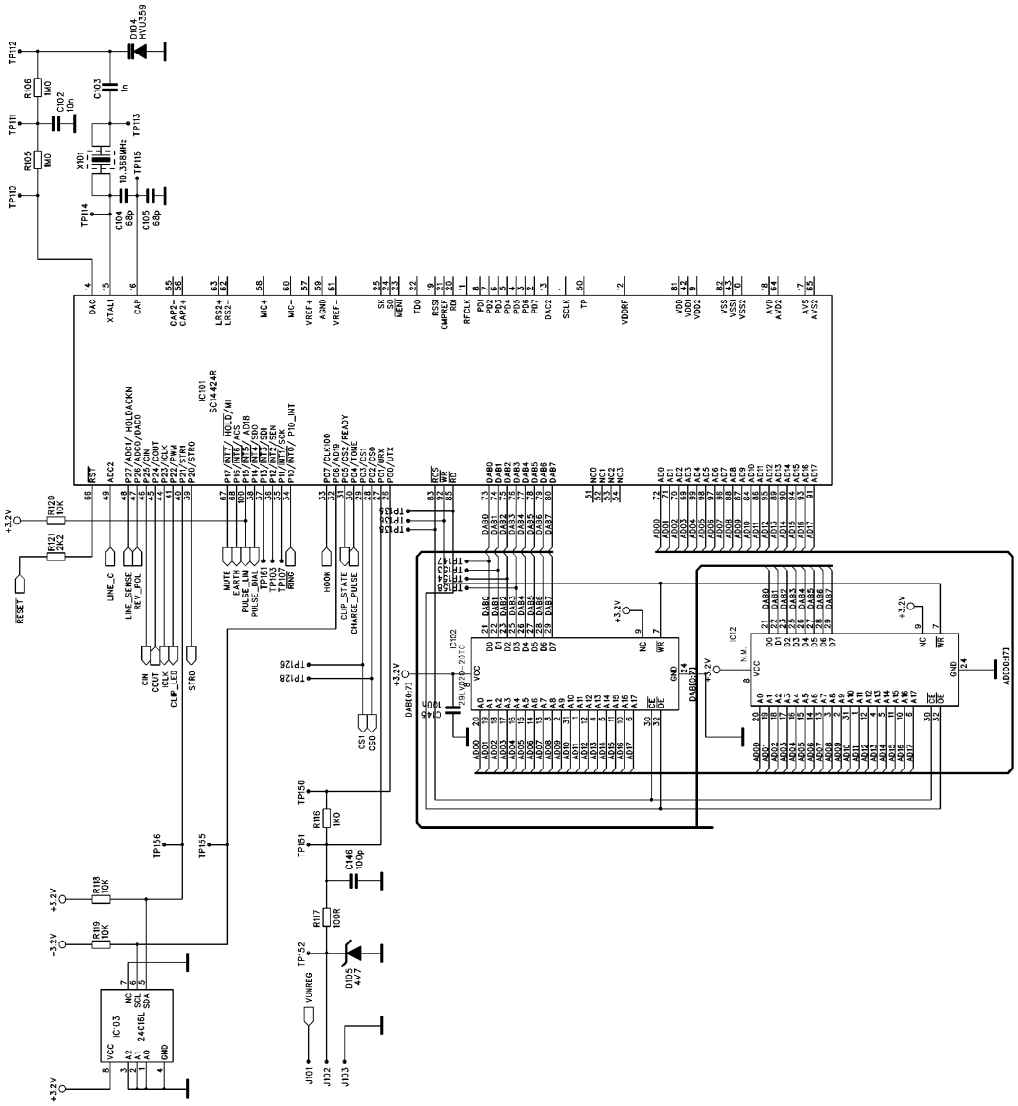
6.1.4. EEPROM (SEE Fig. 19)

The electrically erasable PROM PQVINM4C32L (IC103) is used to store all the temporary operating parameters for the base (see EEPROM LAYOUT). It uses a two-line serial data interface with the BBIC, with bi-directional data on pin 5 (TP156), and clock on pin 6 (TP155).

6.1.5. CLOCK GENERATION (SEE Fig. 19)

A single clock generator in the BBIC uses an external crystal X101 to derive all clock frequencies used in the base. The crystal is tuned to the exact frequency of 10.368 MHz during manufacture by feeding a DC voltage from a DAC in the microcontroller (from pin 14 of IC101) to the varicap diode D104 (TP112). / The BBIC provides buffered clock signals RFCLK (pin 11, TP157) at 10.368 MHZ for the Frequency Synthesizer, which is only active during the PLL lock period. Other clock is SCLK on pin 1 (3.456MHz). The basic data rate for TRADAT and RECDAT is 1.152 Mbits/s, which is 10.368 MHs divided by 9. The data rate for the serial link to the phase lock loop is 45.5 kbits/sec.

Circuit Diagram / Fig19



6.1.6. FACTORY SERIAL PORT (SEE Fig. 19)

In order to communicate with the handset during manufacture and servicing (using a PC) a serial data link has been provided. Serial data input/output is provided on J102 (TP151), and a ground is provided on J103. The bi-directional serial data line is split into two at IC101 pin 27 (input) and pin 26 (output). Data rate is 9600 baud. D105 provides ESD protection, and R117 and C146 provide RF de-coupling.

6.1.7. AUDIO PATH-RX AUDIO-LINE INPUT (SEE Fig. 20)

Audio from the Line Interface TXAF (TP123) enters the BBIC on pin 58. R111 and C113 are to balance the line input amplifier, into the ADC part of the codec, where it is sampled and turned into digital data. The burst mode controller then processes this raw data (called the B-field) performing encryption and scrambling, adding the various other fields that go together to produce the GAP standard DECT frame, assigning to a time slot and channel etc. The data then passes through the gaussian filter to emerge on pin 22 as TRADAT, (TP132).

6.1.8. AUDIO PATH - TX AUDIO - LINE OUTPUT (SEE Fig. 20)

Audio from the receiver RECDAT enters the BBIC on pin 20 and passes through the clock recovery circuit. The burst mode controller separates out the B-field data, and performs de-encryption and de-scrambling as required. It then goes to the DAC part of the codec where data

is turned back into analogue audio. The audio signal is amplified by the gain-controlled line output amplifier, and balanced audio is output on pin 63, and fed as RXAF (TP120) to the Line Interface.

Circuit Diagram

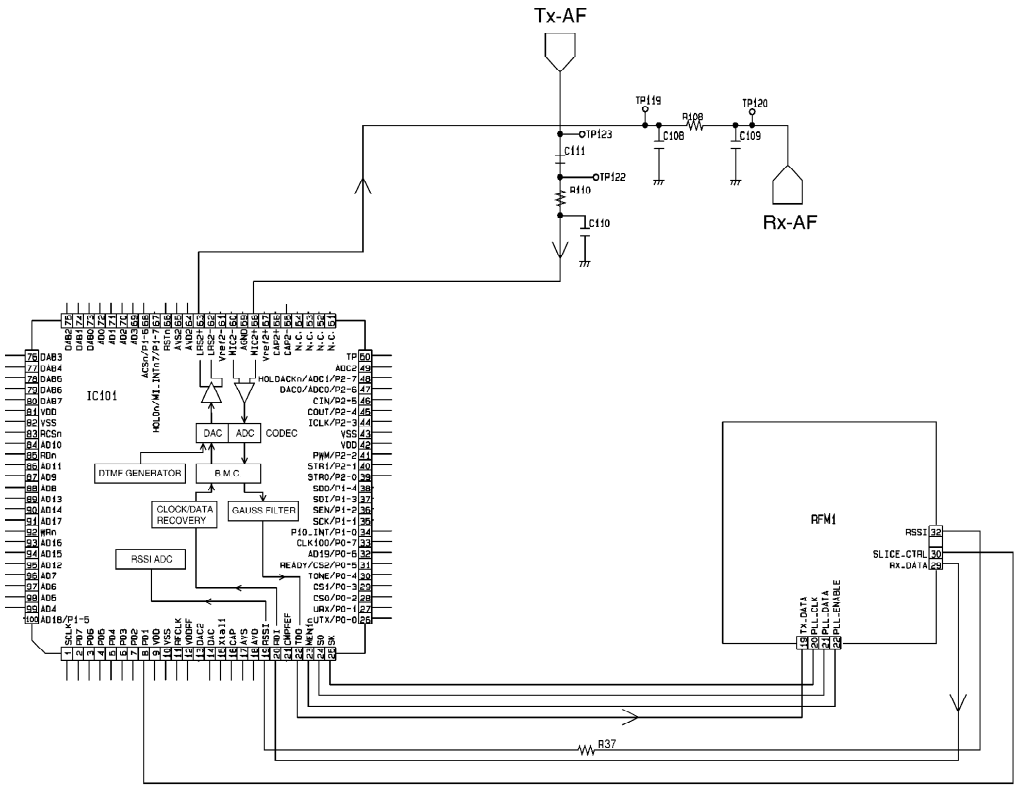


Fig. 20

6.2. THE LINE INTERFACE SECTION

6.2.1. INTRODUCTION

This section consists of the telephone line interface, bell detector, hookswitch, pulse dialing circuits, audio circuits, DC mask & line impedance circuits, power supplies, and battery charger circuits.

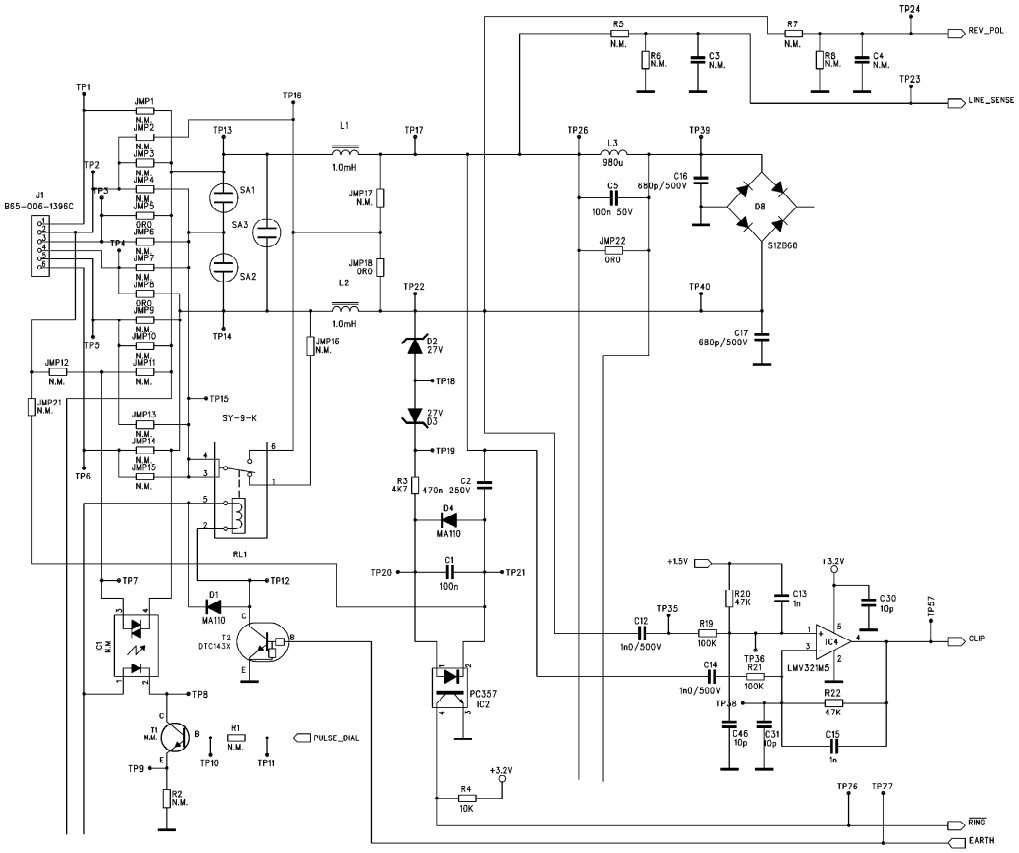
6.2.2. TELEPHONE LINE INTERFACE (SEE Fig. 21)

The telephone line is connected (via 2 or 3 jumpers selected for country of destination) to a bridge rectifier D8. Surge suppressor SA3 protects against excessive line voltages. Test points are TP14 (A), TP13 (B). Bridge rectifier D8 provides for lines of either polarity. The output of D8 is “Line +” (TP50) and “Line -” which is ground.

6.2.3. BELL DETECTOR (SEE Fig. 21)

The AC ringing signal is detected by optocoupler IC2, using its internal diode in conjunction with D4. DC from the line is blocked by C2. The other components D2, D3, and R3 reduce current and increase the circuit impedance in line with national requirements. When ringing is detected IC2 will turn on, and the RING line (TP76) will be dragged to a low voltage.

Circuit Diagram / Fig. 21



6.2.4. CLIP CIRCUITS (SEE Fig. 21)

The caller ID signal is detected by IC4.

6.2.5. HOOKSWITCH (AND PULSE DIALING) (SEE Fig. 22)

T8 is the hookswitch, driven by T9. When the phone is “off-hook”, the HOOK control signal from the BBIC will be a high logic level (+3V), and both transistors will be on, thus T8 will “loop” the line. The zenner diode D10 protects transistors T13 against transient line voltages.

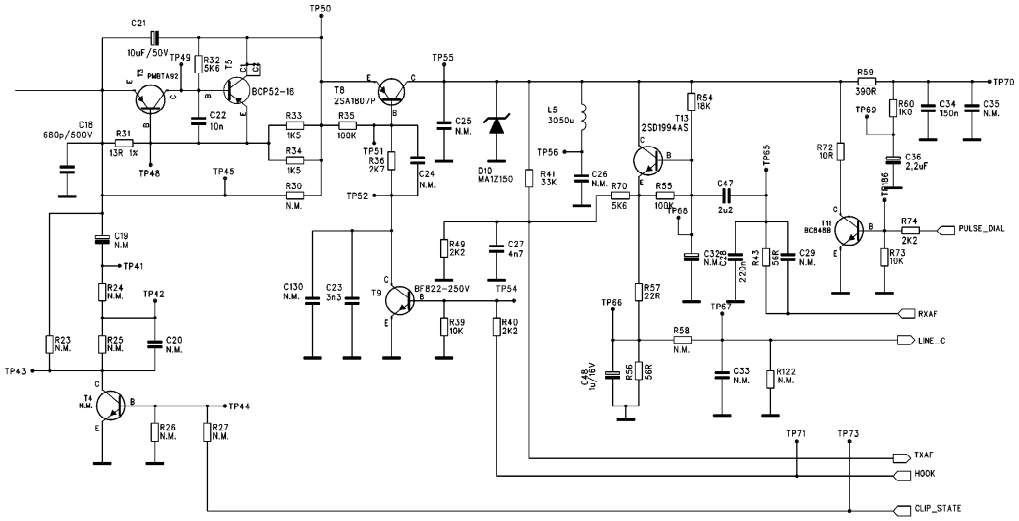
6.2.6. PULSE DIALING (SEE Fig. 22)

During pulse dialing the hookswitch (T8, T9) is used to generate the pulses using the HOOK control signal, which is set high during pulses. To force the line impedance low during the “pause” intervals between dial pulses, the PAUSE-DIAL signal turns on T11, (increases current), thus reducing line impedance (see 8.3.10. BATTERY CHARGER)

6.2.7. AUDIO CIRCUITS (SEE Fig. 22)

The line output signal from the BBIC RXAF is amplified by T13. The RXAF line is DC coupled to T13 thus making it work as a current limiter (typically < 8mA). The emitter load of T13 is complex to achieve the correct frequency response, since the line load is also complex. The line input signal TXAF is taken from the junction of R41 and R70. Phase cancellation of the line output audio occurs at this point, so that only incoming line audio should be passed to the BBIC on TXAF.

Circuit Diagram / Fig. 22



6.2.8. POWER SUPPLIES (SEE Fig. 23)

The AC Adaptor for the KX-TCD953 / KX-TCD958 consists of two separate isolated DC supplies providing a +8 V supply for the base circuitry, and a 9 V supply only for the charger circuit. The isolation is because the main base circuitry is connected to the telephone line, so potentially hazardous voltages may be present, while the charger circuitry has charge contacts that could be touched by the operator, so the two supplies must be kept separate. The 8 V supply from the AC Adaptor is connected via J2 pin 1 (TP90) +8 V, and J2 pin 2 (TP89) ground. The unregulated + 8 V supply is fed to the first regulator.This regulator IC7 provides a regulated output pin 2 (TP91) of +4.0 V (called +4V). The second regulator IC11 is fed with +4V and provides the stable +3.2V supply (TP95). During power-up this regulator generates a RESET signal (TP94) which is used to reset the microcontroller and BBIC.

The regulator IC6 provides a regulated output pin 2 (TP109) of +6.0V.

6.2.9. BATTERY CHARGER (SEE Fig. 23)

The 9 V supply from the AC Adaptor is connected via J2 pin 6 (TP82) positive, and J2 pin 5 (TP78) negative. The constant current battery charger circuit is made up of T14 and T15 (series pass transistor) and associated components. Charging detector circuit T16 switches on when a charging current flows through R64 and D11, and turns on IC6. The charge contacts are charge current flows in via J5 (TP88), through T15, R63, AC ADAPTOR 4V supply, R64, D11, and out of J5 (TP84).

Circuit Diagram / Fig. 23

6.3. Speakerphone (SEE BLOCK DIAGRAM Fig.18 and SCHEMATIC DIAGRAM[BASE UNIT])

The extra circuitry for the TCD953/958 speakerphone circuit comprises a microphone, a speaker, a speakerphone codec IC10 and a speaker amplifier IC14.However, note that the majority of the speakerphone functionality is contained within the existing BBIC IC101. This includes the switching between microphone and speaker path, echo suppression and cancelling, etc. The speakerphone codec IC10 only provides analogue-to-digital conversion and digital-to-analogue conversion.

A bi-directional serial data link is provided between the speakerphone codec IC10 and the BBIC IC101. The 8.0 kHz strobe signal STRO from IC101 pin 39 (TP46) is a synchronising pulse for this data link, and the 2.3 MHz clock ICLK from IC101 pin 44 (TP47) is the clock for the serial data link, and is also the sampling clock for the analogue-to-digital converter (ADC) and digital-to-analogue converter (DAC) in the speakerphone codec IC10.

The DC supply to the speakerphone codec IC10 pin 6, is a 3.1V supply, derived from the regulator IC6 (TP185). The DC supply to the speakerphone amplifier IC14 pin 6, is a 6.4V supply, derived from the regulator IC5 (TP109).

6.3.1. Path from Telephone Line to Speaker

Audio from the telephone line passes via the normal signal path of J1 tel-line connector (TP13 and TP14), D8 bridge rectifier (TP45), T3/T5 current limiter (TP50), T8 hookswitch (TP55), and R41 (TP123), to BBIC IC101 pin 58 (TP121).In the BBIC it is converted from an analogue audio signal into digital data in the BBIC's internal codec. Additionally, the speakerphone switching and echo suppression functions are contained within the BBIC.An eight level speaker volume control is provided, and the functionality for this is also contained within the BBIC.The digital data is sent from the BBIC IC101 pin 46 to IC10 speakerphone codec pin 10 (TP25), via the serial data link. In the speakerphone codec IC10, the data is converted back to analogue audio, and fed from IC10 pin 5 (TP178) and to the speaker amplifier IC14 pin 4 (TP179). The audio signal is amplified in IC14, and the push-pull audio output is sent from IC14 pins 5 and 8 to the speaker (TP101) and (TP102).

6.3.2. Path from Microphone to Telephone Line

DC bias for the microphone is provided from the BBIC IC101 pin 57 (TP170) (positive bias) and pin 51 (TP171) (negative bias). The bias is fed to the microphone via R89 and R82 (positive bias) and R90 and R83 (negative bias). The balanced audio signal from the microphone is fed to the speakerphone codec IC10 pins 19 and 18 via R82 (TP172), R87, R99, and R83 (TP173), R88, and R100.

The analogue signal is converted into a digital signal in the speakerphone codec (IC10), and the digital signal on IC10 pin 11 (TP37), is fed via the serial data link to the BBIC IC101 pin 45. The speakerphone switching and echo suppression functions are contained within the BBIC. The digital data is converted again into an analogue signal in the BBIC's internal codec.

The analogue signal is fed from IC101 pin 63 (TP119), via T13 audio amplifier (TP55), T8 hookswitch (TP50), T3/T5 current limiter (TP45), D8 bridge rectifier, to J1 tel. line connector (TP13 and TP14), and out to the telephone line.

6.4. Keyboard

The TCD953 is fitted with a keyboard which provides the user with comprehensive speakerphone facilities, and includes a full numeric keypad for dialling out.The keyboard is mounted on a separate pcb (2AP board), and is connected to the main pcb via J3 connector. Additional circuitry for the keyboard comprise a tri-state latch (IC9) and tri-state buffer (IC8), both mounted on the main pcb.Keyboard scan pulses and LED drive signals are fed from the BBIC address/data bus to the keyboard via latch IC9 and connector J3.Key press information from the keyboard is fed via J3 and the tri-state buffer IC8 to the BBIC address/data bus
The DC supply to IC8 pin20, and IC9 pin 20, is a 3.1V supply, derived from the regulator IC6 (TP185).

7. BLOCK DIAGRAM RF UNIT (HANDSET)

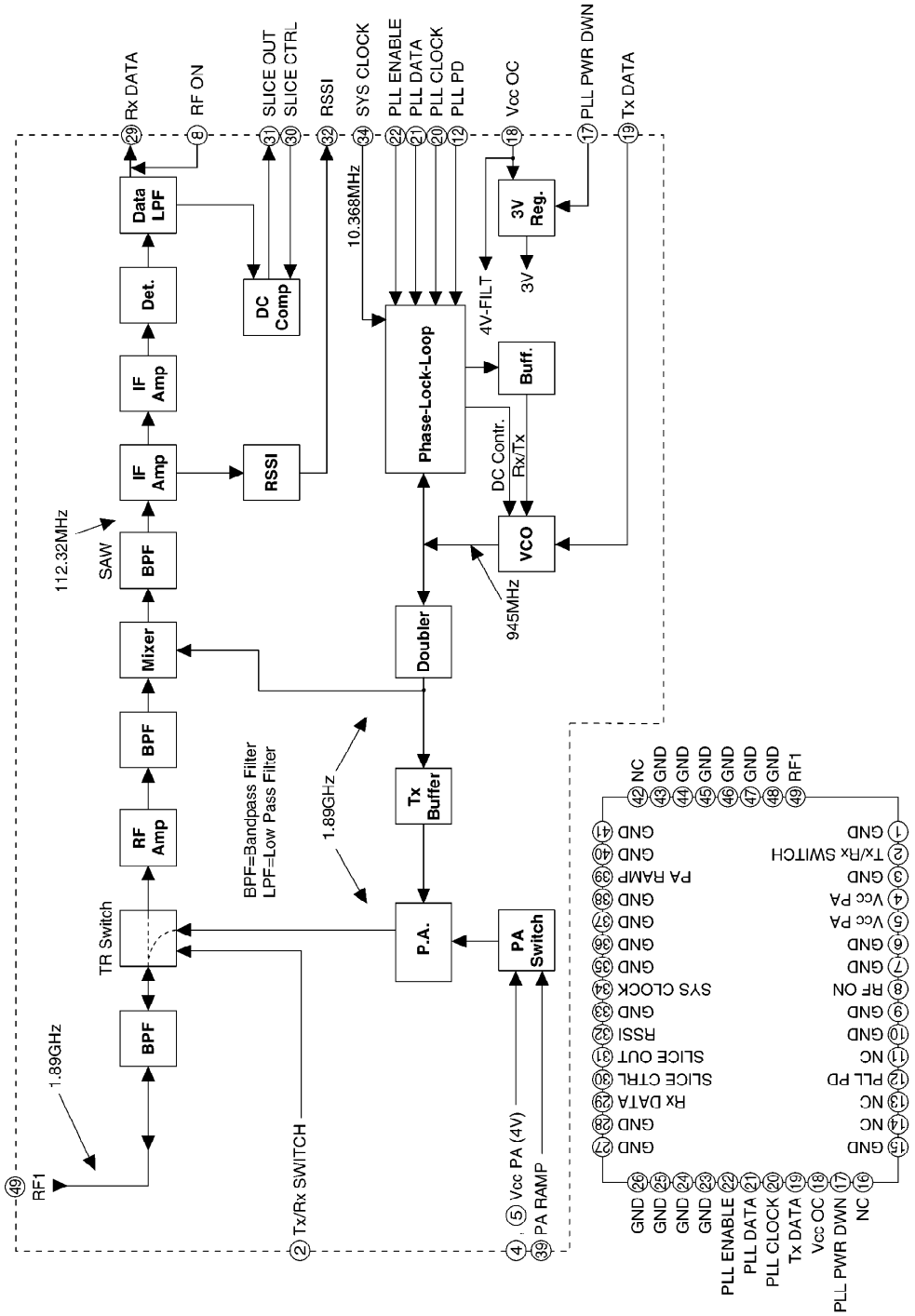


Fig. 24

8. BLOCK DIAGRAM BASE-BAND SECTION (HANDSET)

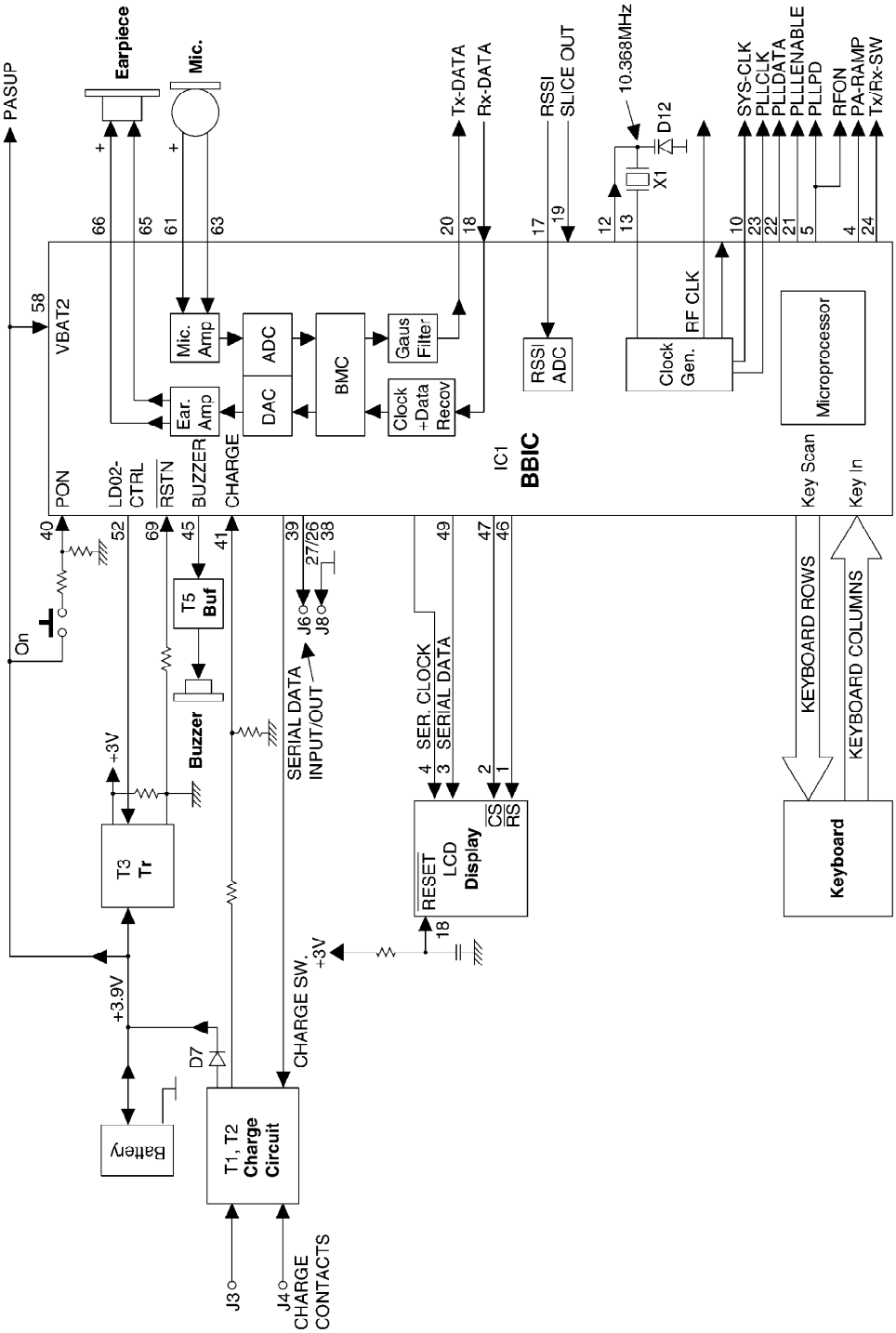


Fig. 25

9. CIRCUIT OPERATION (HANDSET)

9.1. THE BASE-BAND SECTION (SEE BLOCK DIAGRAM Fig. 25)

9.1.1. INTRODUCTION

The base-band section consists of a base-band integrated circuit (BBIC), a Flash PROM, an EEPROM, an LCD Display, a Microphone, an Earpiece, and power supply/battery management circuits.

9.1.2. THE BASE-BAND INTEGRATED CIRCUIT (BBIC)

The National SC14405 BBIC (IC1) is a CMOS device designed to handle all the audio, signal and data processing needed in a DECT handset. It contains two microprocessors - one general purpose - while the other burst mode controller takes care of DECT specific physical layer and radio section control.The BBIC also contains the ADPCM transcoders, a low power 14 bit codec (ADC/DAC), various other ADCs, DACs and timers, a UART for data communication with RF unit, a gaussian filter for the DECT GFSK modulation method, clock and data recovery circuits, a clock oscillator circuit, a battery management circuit, and a pair of gaincontrollable amplifiers for the microphone and earpiece.

9.1.3. LCD DISPLAY, AND DISPLAY DRIVER (SEE Fig. 26)

The LCD display also receives data via a serial interface. Serial data is sent to LCD display on pin 3 (TP70). The RS signal (pin 1, TP67) is used by the BBIC to send either commands or data.

Circuit Diagram

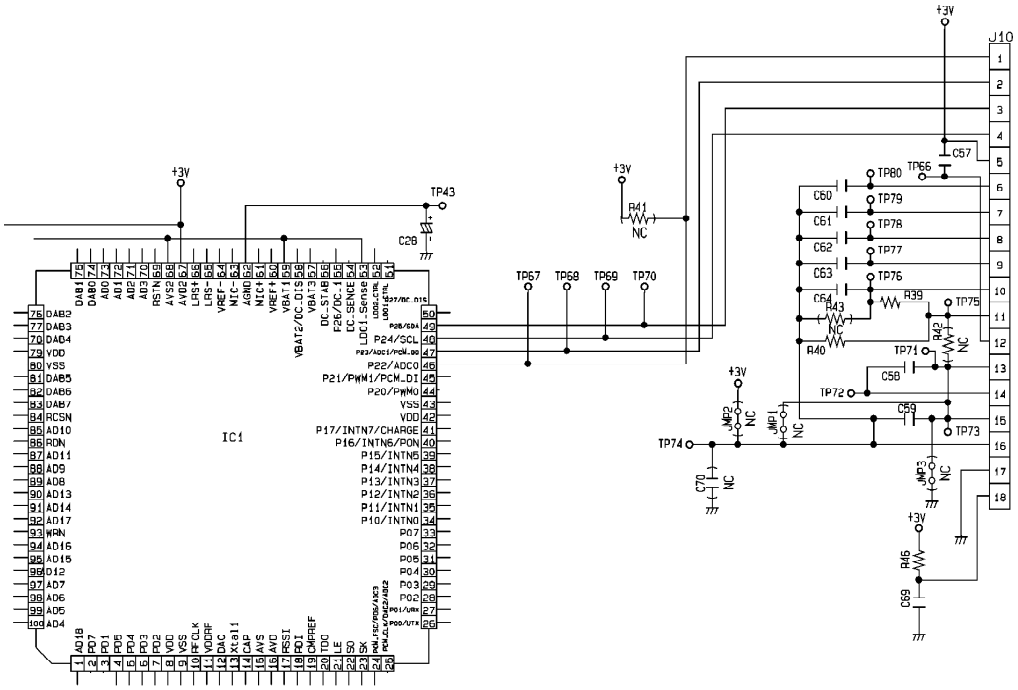


Fig. 26

9.1.4. AUDIO PATH - TX AUDIO (SEE Fig. 27)

Balanced audio from the microphone (TP40 and TP41) enters the BBIC at pins 61 and 63. A balanced bias voltage for the (“electret” type) microphone is supplied by the BBIC from pins 60 and 64 via R31 and R32. This supply is de-coupled by R22, R27, C21, C28, and C22. RF de-coupling of the microphone signal is provided by R27, C25, R28, C26, R24, R25, and C20. The microphone audio signals are coupled to the BBIC via C22 and C23, which provide some high pass filtering. / In the BBIC audio passes through the gain-controlled microphone amplifier, into the ADC part of the codec, where it is sampled and turned into digital data. The burst mode controller then processes this raw data (called the B-field) performing encryption and scrambling, adding the various other fields that go together to produce the GAP standard DECT frame, assigning to a time slot and channel etc. The data then passes through the gaussian filter to emerge on pin 20 as TRADAT.

9.1.5. AUDIO PATH - RX AUDIO (SEE Fig. 27)

Audio from the receiver RECDAT (TP54) enters the BBIC on pin 18 and passes through the

clock recovery circuit. The burst mode controller separates out the B-field data, and performs de -encryption and de-scrambling as required. It then goes to the DAC part of the codec where data is turned back into analogue audio. The audio signal is amplified by the gain-controlled earpiece amplifier, and balanced audio is output on pins 65 and 66, and fed to the earpiece (TP31 and TP32). The leads feeding the earpiece are RF de-coupled by C15 to R22, C17, C16, R23, and C18. C19 provides low pass filtering.

Circuit Diagram

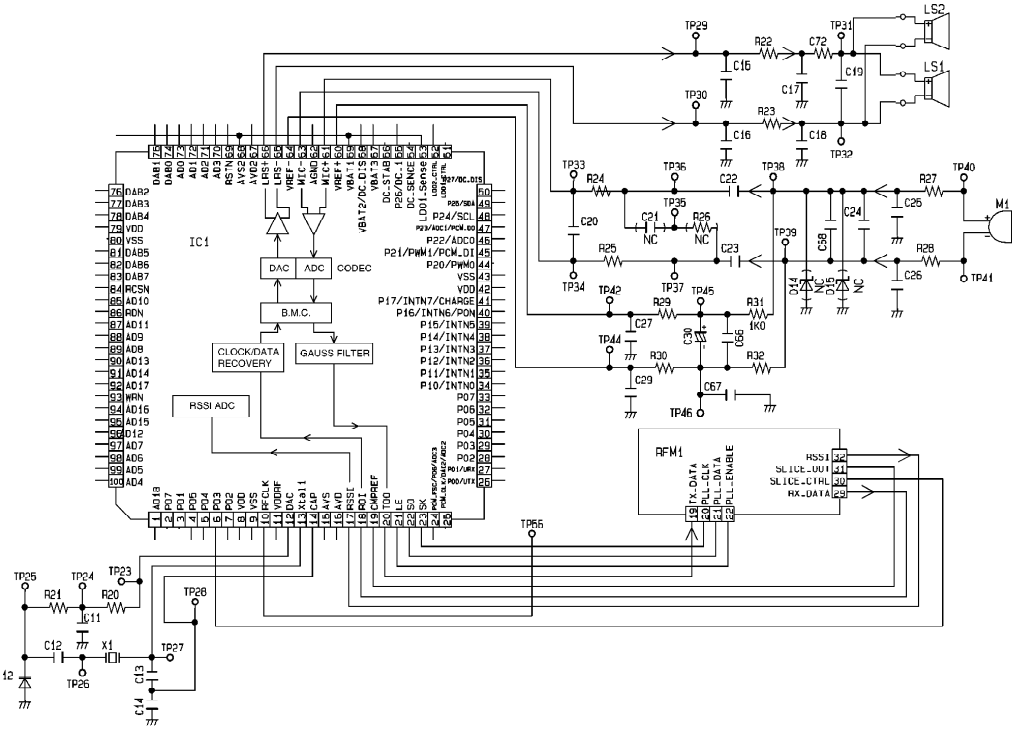


Fig. 27

9.1.6. CLOCK GENERATION (SEE Fig. 28)

A single clock generator in the BBIC uses an external crystal X1 to derive all clock frequencies used in the handset. The crystal is tuned to the exact frequency of 10.368 MHz during manufacture by feeding a DC voltage from an internal DAC (from pin 12) to the varicap diode D12 (TP25). The RFCLK output (pin 10, TP56) is a buffered clock signal at 10.368 MHz for the Frequency Synthesizer, that is only active during the PLL lock period (see section 1.3). The basic data rate for TX-DATA and RX-DATA is 1.152 Mbits/s, which is divided by 9. The data rate for the serial interface to the phase-lock-loop is also 1.152 Mbits/s.

9.1.7. KEYBOARD (SEE Fig. 28)

The keyboard “On” button is connected directly to pin 41 of the BBIC (TP10). When pressed it turns the handset on and off (must be held for off). All other keys are connected in a row/ column matrix. They are scanned in six rows using scan pulses (only active when keys are pressed) from IC1 pins 28 to 33. The four key matrix columns are input to the BBIC on pins 31 to 34.

Circuit Diagram

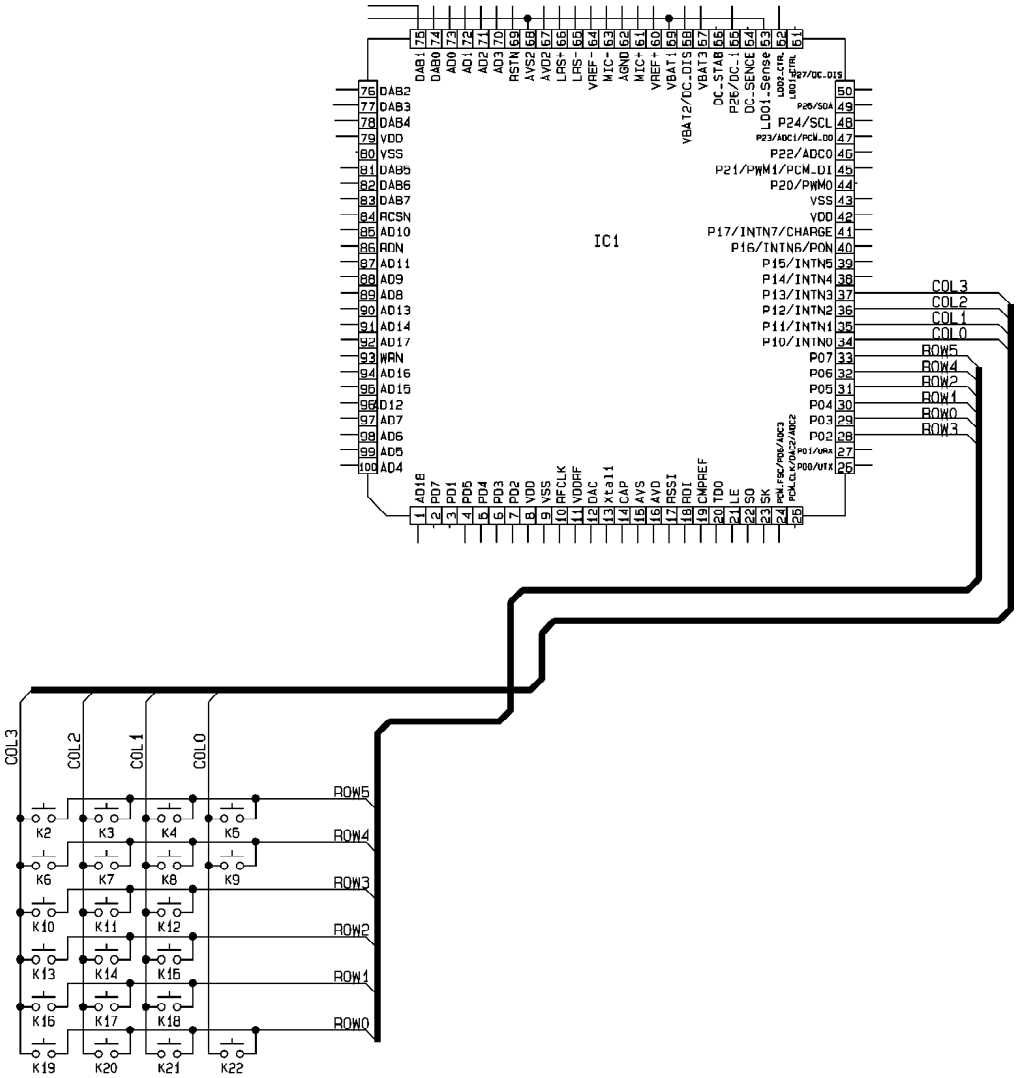


Fig. 28

9.1.8. FACTORY SERIAL PORT (SEE Fig. 25)

In order to communicate with the handset during manufacture and servicing (using a PC) a serial data link has been provided. Serial data input/output is provided on J6 (TP65), and a ground is provided on J7. The bi-directional serial data line is split into two at IC1 pin 27 (input) and pin 26 (output). Data rate is 9600 baud or 115.2 kBaud. D13 provides ESD protection, and R37 and C56 provide RF de-coupling.

9.1.9. BUZZER CIRCUIT (SEE Fig. 29)

A square-wave signal from IC1 pin 45 is used to sound the buzzer via switching transistor T5 (TP22). Various tones and cadences are used dependent on function. Buzzer volume is varied by changing the duty cycle of the drive waveform. D11 provides quenching of back-emf generated when T5 turns off.

9.1.10. BATTERY SUPPLY (SEE Fig. 29)

The three cell NiCd/NiMH rechargeable battery supplies the handset via 2A fuse (actually a coil), and is de-coupled by C3 and C4. It directly supplies T3 in the baseband section, and also the Tx PA in the RF Section. It also supplies IC1 (de-coupled by C9), and most of the RF Section (VCC-OC) (decupled by R35 and C47, C48 and VCC-PA).

9.1.11. MAIN 3V REGULATOR (SEE Fig. 29)

The BBIC measures the battery voltage on pins 58 using an internal ADC. If the battery voltage is below 3.36 V, TC3 is switched to power off mode. R7 and C5 provide a reset pulse (TP84) used for resetting the BBIC when power on. The +3 V supply (TP10) is fed to the BBIC, Flash PROM, EEPROM, and Display Driver.

9.1.12. BATTERY CHARGING CIRCUIT (SEE Fig. 29)

The charge circuit is designed to operate with a constant current charger in the base. L1, L2, D2 and D4 protect against electro-static discharge (ESD). The charging current from the base is turned on and off by T1 using a control signal from the BBIC (pin 39, TP6) via T2. R3 provides initial current in the event of a totally flat battery, and D6 protects against the high voltage present on the charge contacts if there is no battery in the handset. R4 and R5 provide a signal for the BBIC to detect (pin 40) that the handset had been placed on the base charger. If the handset is off, it will be switched on, and charging will start. D2, D3, D4, and D5 act as steering diodes to enable the handset to be placed on the cradle either way up (i.e. the handset is reversible).

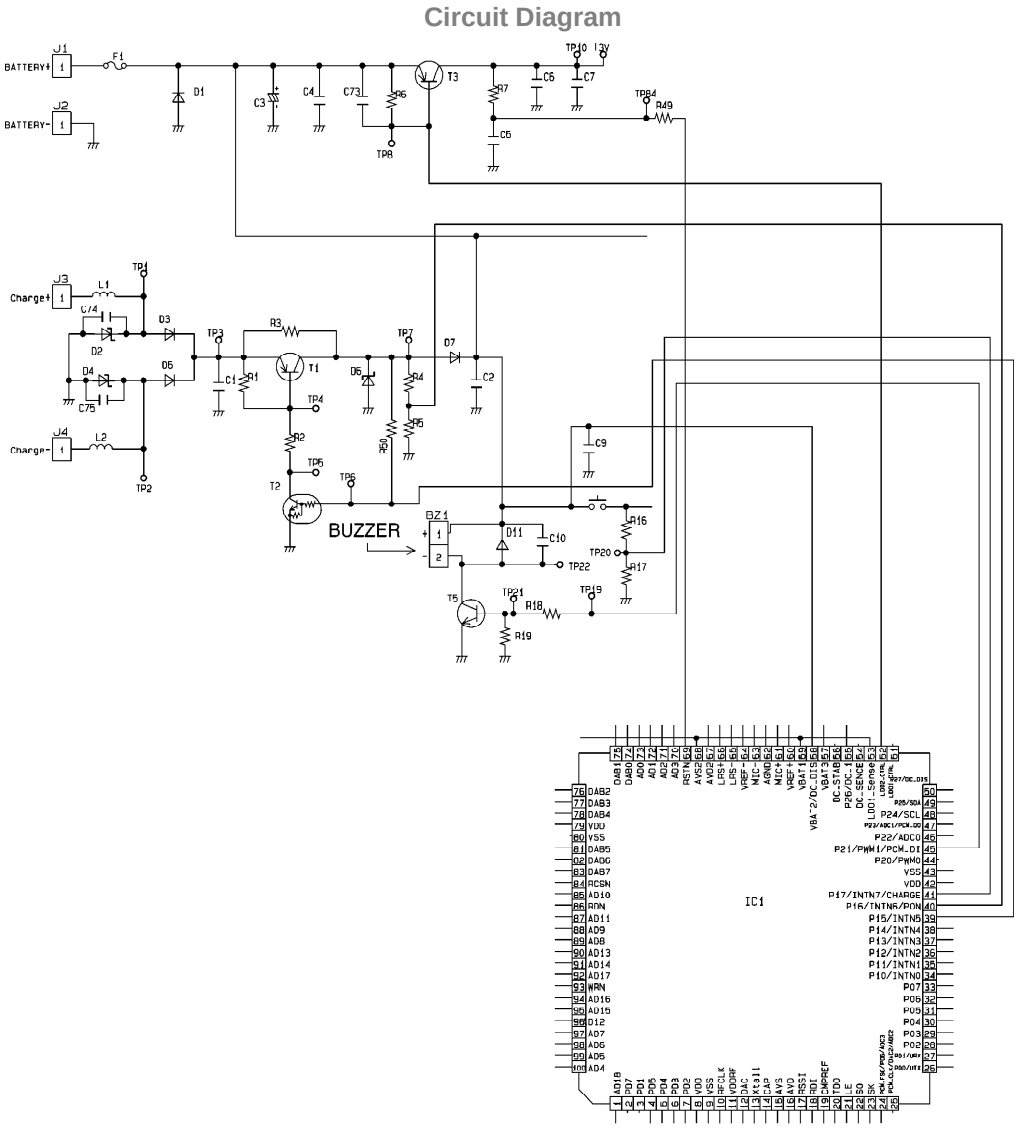


Fig. 29

10. ADJUSTMENT (BASE UNIT)

Adjustment objectives

Adjustment item	Symptom	Remedy
Clock frequency	Synchronization with the portable handset is lost immediately. No link is established.	Perform the adjustments described in item(1).

Tools required for adjustments

- Frequency counter
- Personal computer
- Serial communication tool
- Test software (batch files)
- Line simulator
- Oscilloscope
- Audio level meter

Item(1)

1. Connect the serial link to test computer to J102 (serial data) and J103 (GND).
2. Connect the AC adaptor.
3. Connect the frequency counter to TP148 (SCLK) and J103 (GND).
4. Send “SETFREQ.BAT” to set the clock frequency. The default value is 80. Increase the value to increase the frequency. The clock frequency must be 3,456 kHz ± 0.007 kHz.

11. ADJUSTMENT (HANDSET)

Adjustment objectives

Adjustment item	Symptom	Remedy
Clock frequency	Synchronization with the portable handset is lost immediately. No link is established.	Perform the adjustments described in item(1).
Low battery	The communication (standby) times is short. The low battery display period is too long or too short.	Perform the adjustments described in item(2).

Tools required for adjustments

- **Frequency counter**
- **Power supply unit (DC 3V~5V, 1A)**
- **Personal computer**
- **Serial communication tool**
- **Test software (batch files)**

Item(1)

1. **Connect the serial link to test computer to J6 (serial data) and J8 (GND).**
2. **Input a 3.9V supply to the handset J5 (+) and J8 (GND).**
3. **Connect the frequency counter to TP56 and J8 (GND).**
4. **Press the “power on” button.**
5. **Send batch file “RFCLK 1”.**
6. **Use batch file “SETFREQ.BAT” to set the clock frequency. The default value is 80. Increase the value to increase the frequency and vice-versa. The clock frequency must be 10,368.000 kHz ± 0.02 kHz.**

Item(2)

1. **Connect the serial link to test computer for J6 (serial data) and J8 (GND).**
2. **Set the battery voltage to 4.6V at J1 and J2.**
3. **Press the “power on” button.**
4. **Send batch file “READBATT.BAT”. The returned hex value is M2.**
5. **Send batch file “WRTBATT.BAT M2”.**
6. **Set the battery voltage to 3.5V at J5 (+).**
7. **Send batch file “READBATT.BAT”. The returned hex value is M1.**
8. **Send batch file “WRTBATT.BAT M1”.**

9. Calculate the low value 2 level:

$$M3\ Dec = \frac{M1\ Dec - (M2\ Dec - M1\ Dec) \times 0.1}{4.6 - 3.5}$$

10. Send "WRTBATT.BAT M3".

12. CHECK PROCEDURE (BASE UNIT)

12.1. TEST EQUIPMENT REQUIRED AND EQUIPMENT SETUP

(a) CMD60

TEST MODE:	FP		
CONFIG MENU	SIGN	SCRAMBLE:	OFF
MANUAL TEST	TRAFFIC SLOT :	2	
	TRAFFIC CARRIER:	5	
	RF LEVEL:	– 55 dBm	
MODULE TEST	TRIGGER:	RISING SLOPE	
	EXP. POWER:	30 dBm	
MODULE TEST	RF GENERA TOR	FREQ:	1888.704 MHz
		DEVIA TION:	288 kHz
		SIGNAL:	01010101
		RF LEVEL:	– 65 dBm

(b) "Bell" Oscillator: FREQUENCY : 25Hz
(c) Power Supply (10V 1A)
(d) DMM
(e) Ammeter
(f) Frequency Counter
(g) Oscilloscope
(h) Computer (PC): Set the computer to the MS-DOS mode. Type: SET_COM1.
(i) Test sof tware (Batch Files)

Connect a 10V supply to the board J2 pin 1 (+), pin 2 (–), (or connect an AC Adaptor).
Connect the computer serial link to the Test Fixture J102 (+), J103 (–).

12.2. INITIAL POWER + BBIC TESTS

1. Turn on the 10V supply.

2. Check for approx. 75 mA current on the 10V supply.

3. Check the 4V supply voltage (TP91). It must be 4.2 ± 0.2V.

4. Check the 3.1V supply voltage (TP95). It must be 3.1 ± 0.2V.

5. Check the 6V supply voltage (TP109). It must be 6.4 ± 0.3V.

6. Connect SCLK (TP148) to CH.1 on the scope.

7. Check if the clock waveform is 3,456 kHz.

8. Send batch file "SELF TEST".

12.3. SET THE CLOCK FREQUENCY

1. Transfer SCLK (TP148) to the frequency counter.

2. Send batch file "SETFREQ nn" to set the clock frequency. The

default value of nn is 80. Increase the value to increase the frequency and vice-versa. The clock frequency must be 3,456 kHz (± 0.007 kHz).

12.4. QUICK Tx CHECK

1. **Set the CMD60 to MODULE TEST.**
2. **Send batch file “RF-I”.**
3. **Confidence check of Power (NTP): it must be +20 to +25 dBm.**

12.5. LOOPBACK TEST

1. **Set the CMD60 to MANUAL TEST.**
2. **Set the CMD60 TRAFFIC CARRIER to 5.**
3. **Send batch file “TESTMODE”.**
4. **On the CMD60, press “SETUP CONNECT”.**
5. **Check the Power (NTP): It must be +20 to +25 dBm.**
6. **Press MODULATION.**
7. **Set Data Type to “Fig.31”.**
8. **Check the Frequency Drift: it must be 0 ± 45 kHz/ms.**
9. **Check the Frequency Offset: it must be 0 ± 40 kHz.**
10. **Check the Deviation (Max. ± B Field) with Data Type “Fig.31”: it must be 202 to 404 kHz.**
11. **Press MENU UP.**
12. **Press POWER RAMP.**
13. **Check the Burst fits mask.**
14. **Press MENU UP.**
15. **Press BER.**
16. **Note the Sensitivity (reduce RF LEVEL for a BER of approx. 1000ppm) : the RF LEVEL must be < - 88 dBm.**
17. **Press MENU UP.**
18. **Press BEARER RELEASE.**

Note:

These tests can be repeated on Traffic Carriers 5 and 9.

12.6. TELEPHONE LINE TESTS

1. **Connect the tel line from the base under test to the line simulator.**
2. **Send batch file “OFFHOOK”.**
3. **Check if the green “In-Use” LED is on.**
4. **Set the line current to 40 mA on the line simulator.**
5. **Send batch file “ONHOOK”.**
6. **Check that the line current is 0 ± 0.5 mA.**
7. **Check if the green “In-Use” LED is off.**
8. **Send batch file “OFFHOOK”.**
9. **Check the DC Voltage on TP45. It must be 9.5 ± 0.5V.**
10. **Send batch file “LINIMP 1”.**
11. **Check the DC Voltage on TP45. It must be < 4.0V.**
12. **Send batch file “LINIMP 0”.**
13. **Send batch file “PULDIAL”.**
14. **Observe on the line simulator current meter that 5 dial pulses are output causing the current to reduce to approx. 20mA.**
15. **Send batch file “STRTDTMF”.**
16. **Check on the scope that a DTMF waveform is output on that tel line.**
17. **Send batch file “STOPDTMF”.**
18. **Disconnect the tel line from the base under test to the line simulator.**
19. **Connect the “Bell” Oscillator to the tel line.**
20. **Set the “Bell” Oscillator voltage to 32V RMS 23Hz.**
21. **Send batch file “RINGDET”.**
22. **Check that the ringing voltage has been detected (1 = detected).**

12.7. CHARGE CURRENT TEST

1. **Connect the 11V supply to J2 pin 6 (+) and J2 pin 5 (-).**

2. Connect the a series load resistor of 56 Ω /2 W to J3 (+) and J4 (-).
3. Switch on the 11V supply.
4. Check the Charge Voltage to J3 and J4 4.4 ± 1.0 V.
5. Switch off the 11V supply.

13. CHECK PROCEDURE (HANDSET)

13.1. TEST EQUIPMENT REQUIRED AND EQUIPMENT SETUP

(a) CMD60

TEST MODE:	PP		
MANUAL TEST	RFPI:	0000000010	
	DUMMY SLOT:	0	
	DUMMY CARRIER:	5	
	TRAFFIC SLOT:	2	
	TRAFFIC CARRIER:	5	
	RF LEVEL:	– 55 dBm	
MODULE TEST	TRIGGER:	RISING SLOPE	
	EXP. POWER:	30 dBm	
CONFIG MENU	SIGN	SCRAMBLE:	OFF
MODULE TEST	RF GENERATOR	FREQ:	1888.704 MHz
		DEVIATION:	288 kHz
		SIGNAL:	00001111
		RF LEVEL:	– 40.7 dBm

(b) Power Supply (12V 1A)
(c) Digital MultiMeter
(d) Oscilloscope
(e) Frequency Counter
(f) Computer (PC): Set the computer to the MS-DOS mode. Type: SET_COM 1.
(g) Test software (Batch Files)

Connect a 3.9V supply to the board J5 (+), J8 (–).
Connect the computer serial link to the Test Fixture J6 (+), J8 (–).

13.2. INITIAL POWER + BBIC TESTS

1. Turn on the 3.9V supply.
2. Press the “Power-on” button.
3. Check for a “beep” and approx 10 to 30 mA current on the 3.9V supply.
4. Check the 3.0V supply voltage (TP10). It must be 2.85 +/- 0.3.
5. Connect RFCLK (TP56) to CH.1 on the scope. Send batch file RFCLK 1.
6. Check if the clock waveform is 10,368.000 kHz, +/- 40Hz.
7. Send batch file “SELF TEST”. The first 4 digits are FLASH ROM checksum, the next 2 digits are RAM test, and must be 00.

13.3. SET CLOCK FREQUENCY

1. Send batch file “RFCLK 1”.
2. Connect RFCLK (TP56) to the frequency counter.
3. Send batch file “SET FREQ nn” to set the clock frequency. The default value of nn is 80. Increase the value to increase the frequency. The clock frequency must be 10,368.000 kHz ± 0.04 kHz.

13.4. QUICK Tx CHECK

1. Set the CMD60 to MODULE TEST.
2. Send batch file “H”.
3. Confidence check of Power (NTP): must be +20 to +25 dBm.
4. Confidence check of Frequency Offset: must be 0 ± 40 kHz.
5. Confidence check of Deviation of B field Data Type 01010101: must be 207 to 270 kHz.

13.5. LOOPBACK TEST

1. Set the CMD60 to MANUAL TEST.
2. Set the CMD60 TRAFFIC CARRIER to 5.
3. Send batch file “TESTMODE”.
4. On the CMD60 press “SETUP CONNECT”.
5. Check Power (NTP): must be +20 to +25 dBm.
6. Press MODULATION.
7. Set Data Type to “Fig.31”.
8. Check the Frequency Drift: must be 0 ± 45 kHz/ms.
9. Check the Frequency Offset: must be 0 ± 40 kHz.
10. Check the Deviation (Max. ± B Field) with Data Type “Fig.31”: must be 201 to 404 kHz.
11. Press MENU UP.
12. Press POWER RAMP
13. Check the Burst fits mask.
14. Press MENU UP.

15. Press BER.

16. Note the Sensitivity (reduce the RF LEVEL for a BER of approx. 1000ppm) : RF LEVEL must be < - 90 dBm

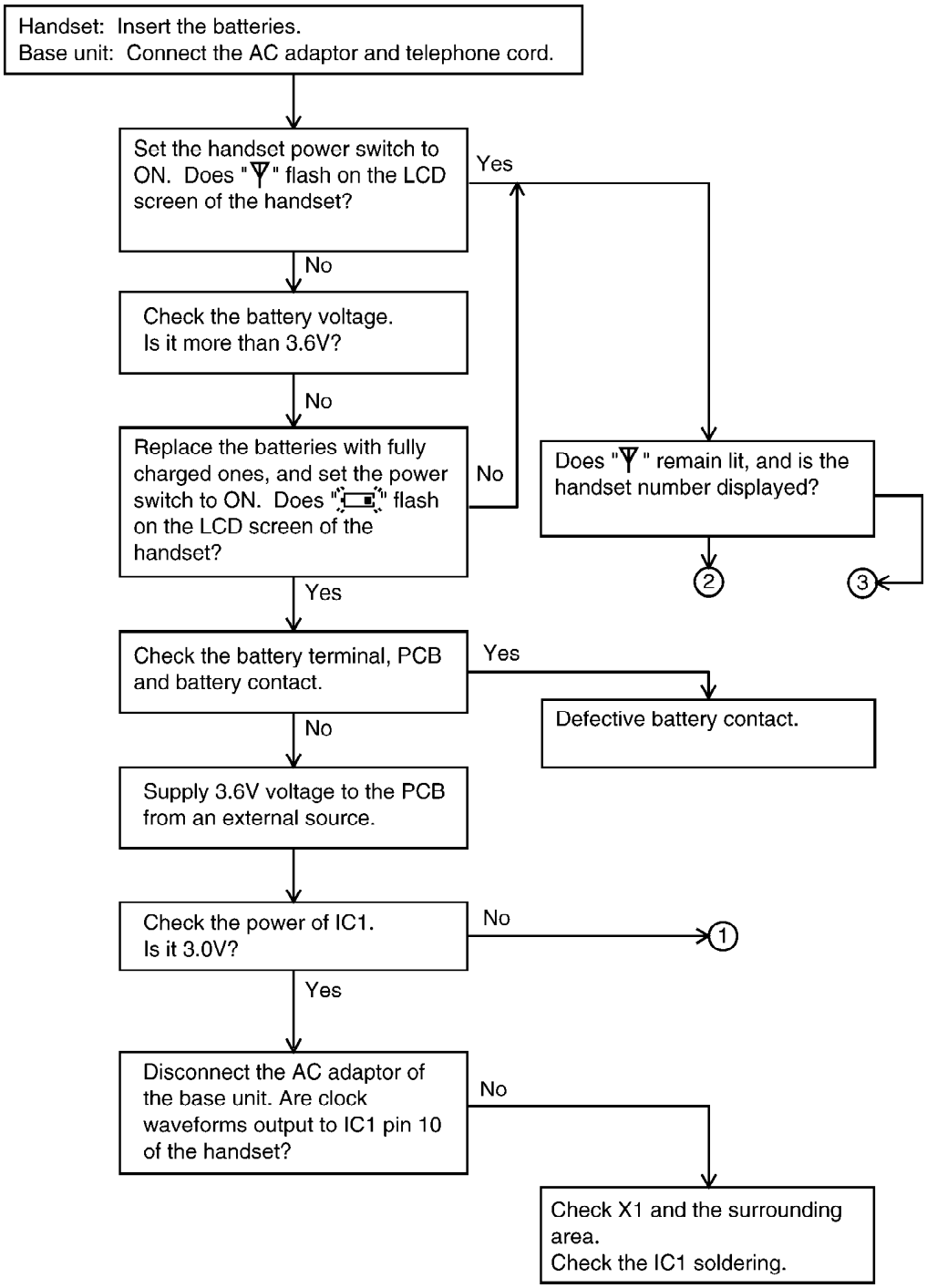
17. Press MENU UP.

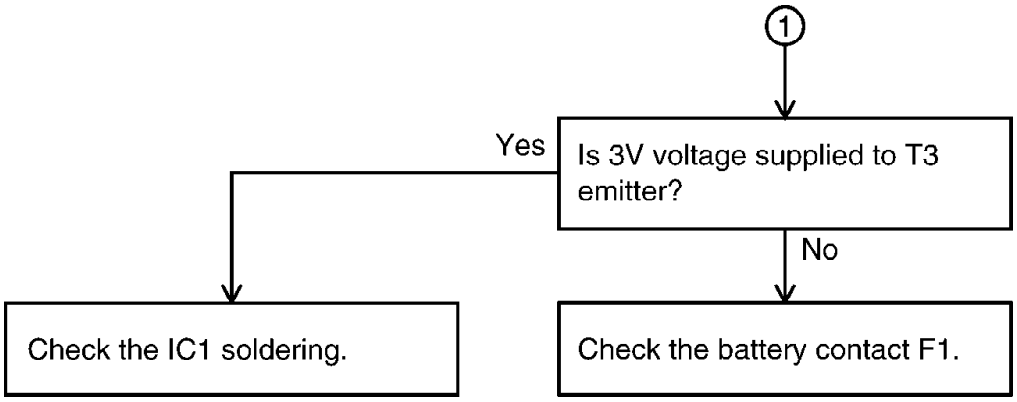
18. Press BEARER RELEASE.

Note:
These tests can be repeated on Traffic Carriers 0 and 9.

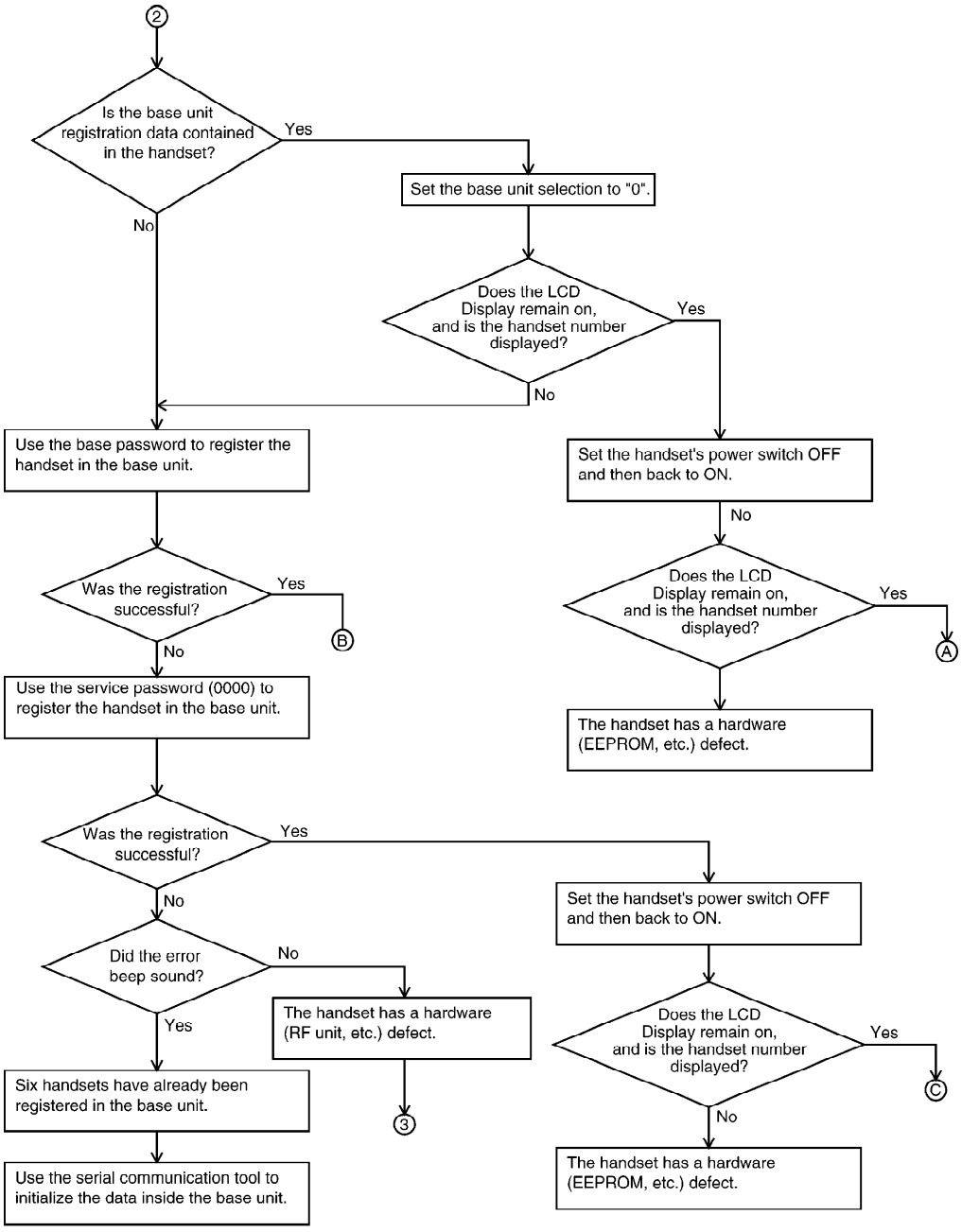
14. TROUBLESHOOTING GUIDE

14.1. HANDSET: DOES NOT OPERATE

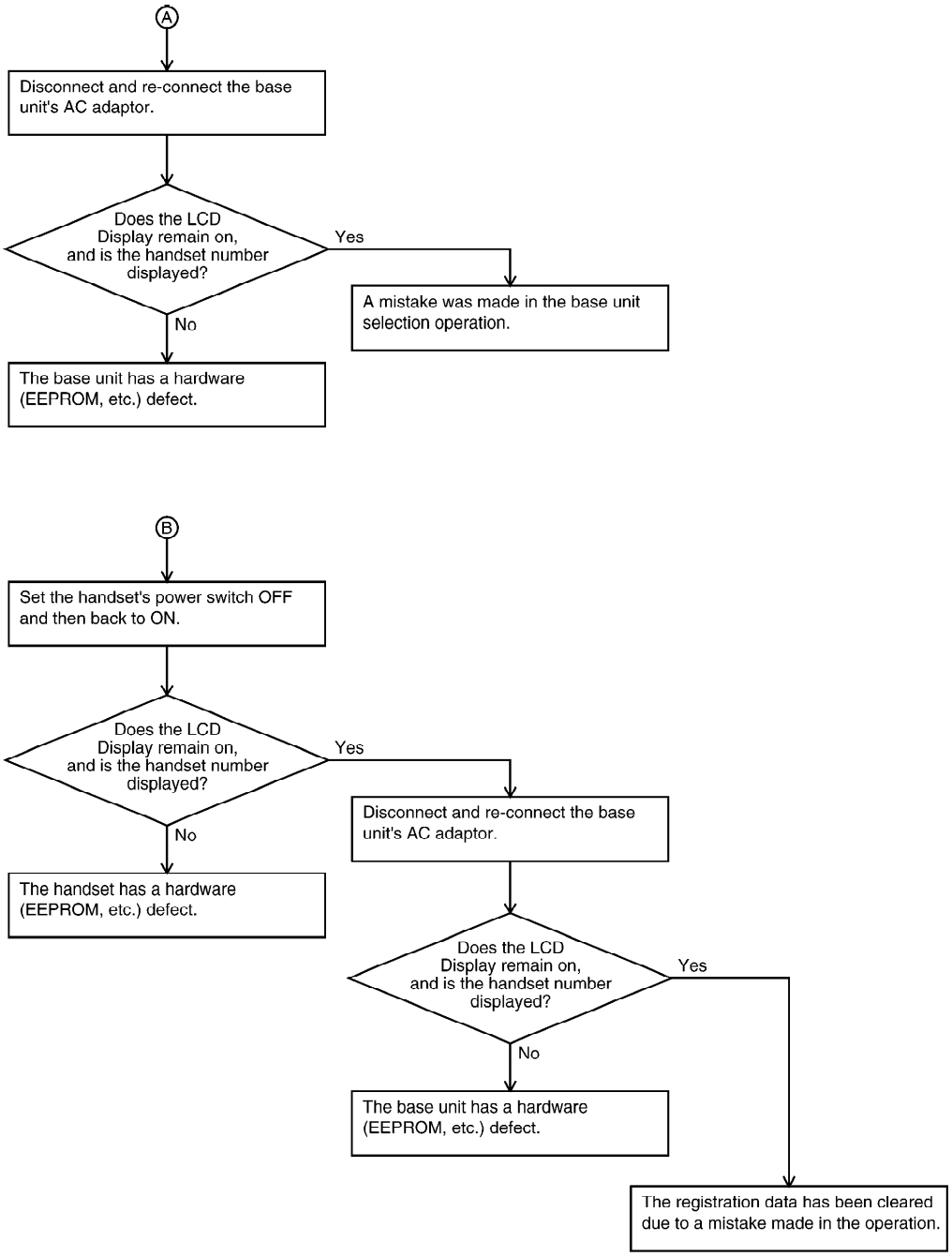

Handset: Insert the batteries.
Base unit: Connect the AC adaptor and telephone cord.
Set the handset power switch to ON. Does " " flash on the LCD screen of the handset?
Yes
No
Check the battery voltage. Is it more than 3.6V?
No
Replace the batteries with fully charged ones, and set the power switch to ON. Does " " flash on the LCD screen of the handset?
No
Does " " remain lit, and is the handset number displayed?
2
3
Yes
Check the battery terminal, PCB and battery contact.
Yes
Defective battery contact.
No
Supply 3.6V voltage to the PCB from an external source.
Check the power of IC1. Is it 3.0V?
No
1
Yes
Disconnect the AC adaptor of the base unit. Are clock waveforms output to IC1 pin 10 of the handset?
No
Check X1 and the surrounding area.
Check the IC1 soldering.

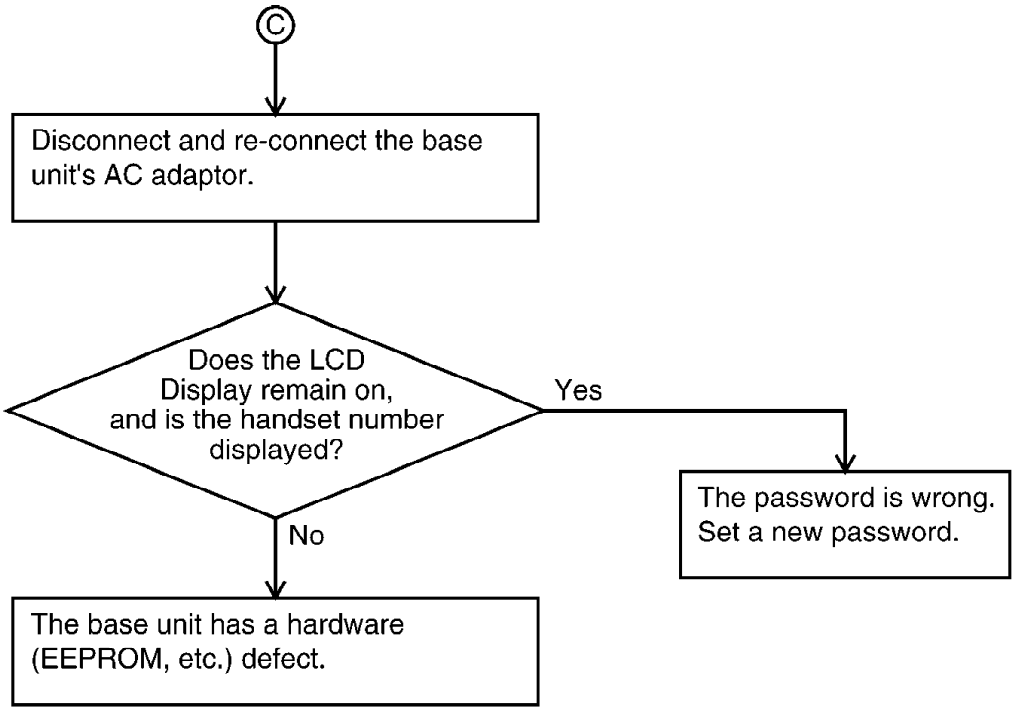


14.2. HANDSET: LINK

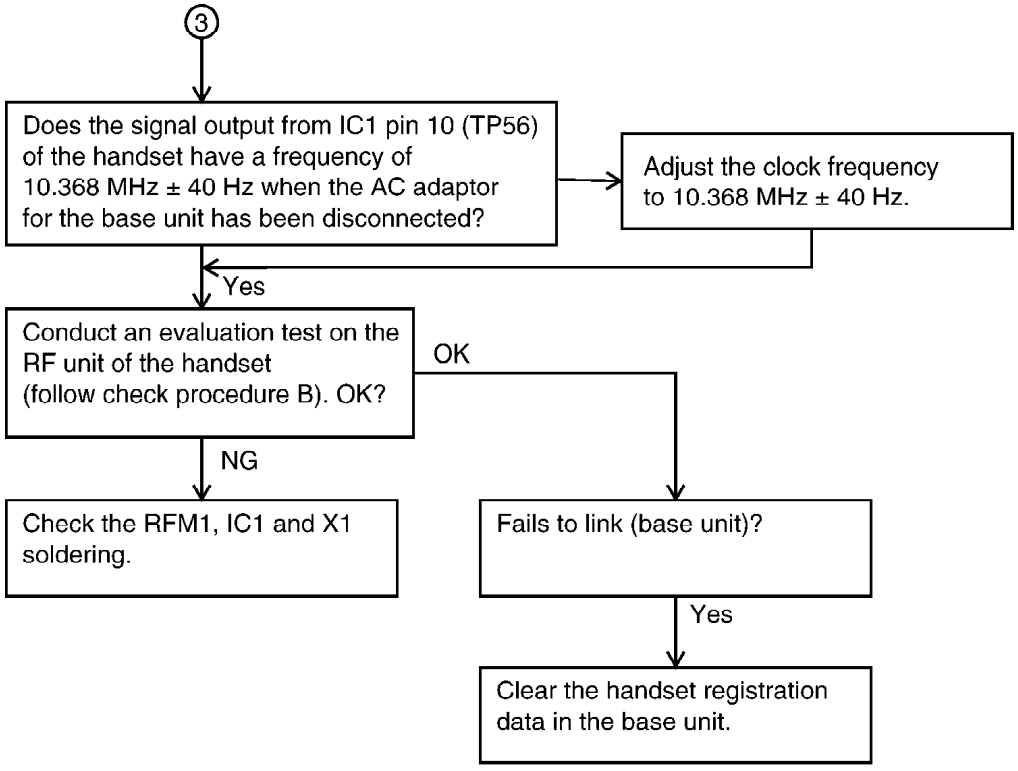


(Use the method for clearing the registered handset data in the base unit.)


A
Disconnect and re-connect the base unit's AC adaptor.
Does the LCD Display remain on, and is the handset number displayed?
Yes
A mistake was made in the base unit selection operation.
No
The base unit has a hardware (EEPROM, etc.) defect.
B
Set the handset's power switch OFF and then back to ON.
Does the LCD Display remain on, and is the handset number displayed?
Yes
Disconnect and re-connect the base unit's AC adaptor.
No
The handset has a hardware (EEPROM, etc.) defect.
Does the LCD Display remain on, and is the handset number displayed?
Yes
No
The base unit has a hardware (EEPROM, etc.) defect.
The registration data has been cleared due to a mistake made in the operation.



14.3. HANDSET: DOES NOT LINK



(Refer to **14.6. TELEPHONE LINE TESTS.**)

14.4. BASE UNIT: DOES NOT CHARGE

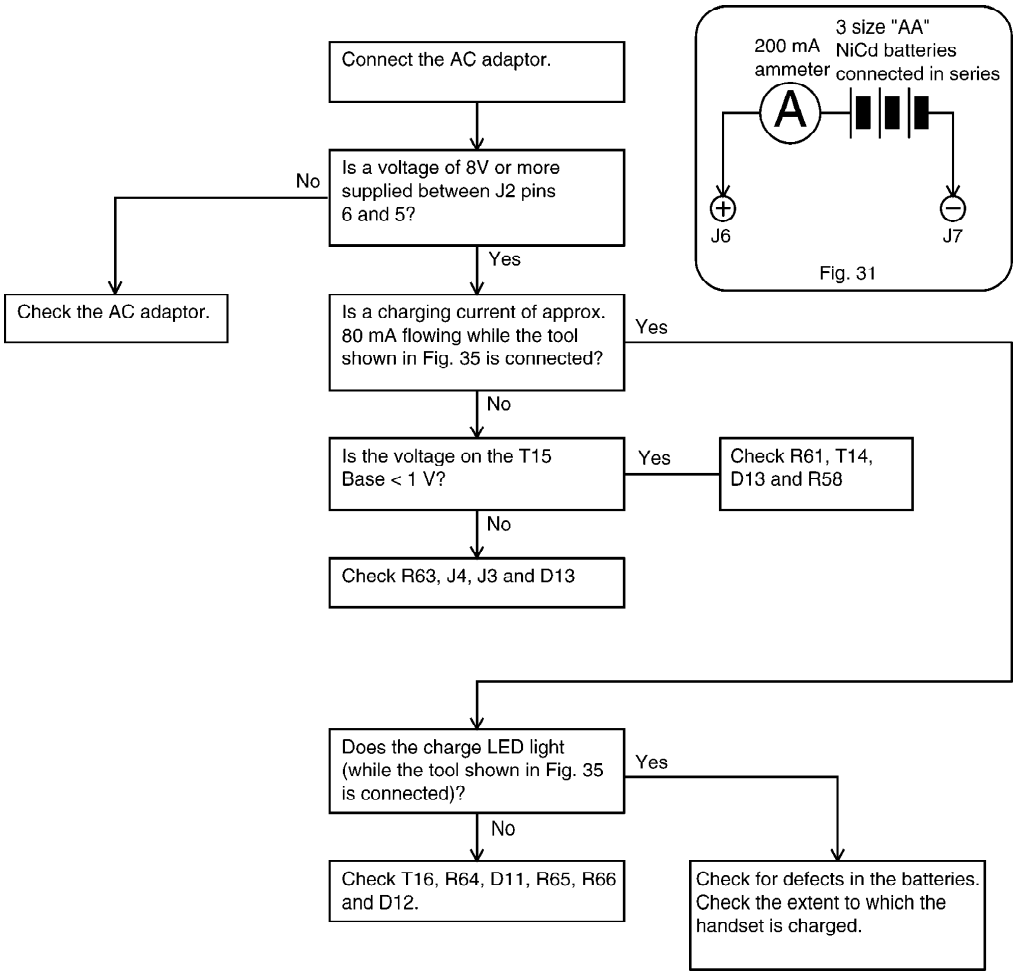
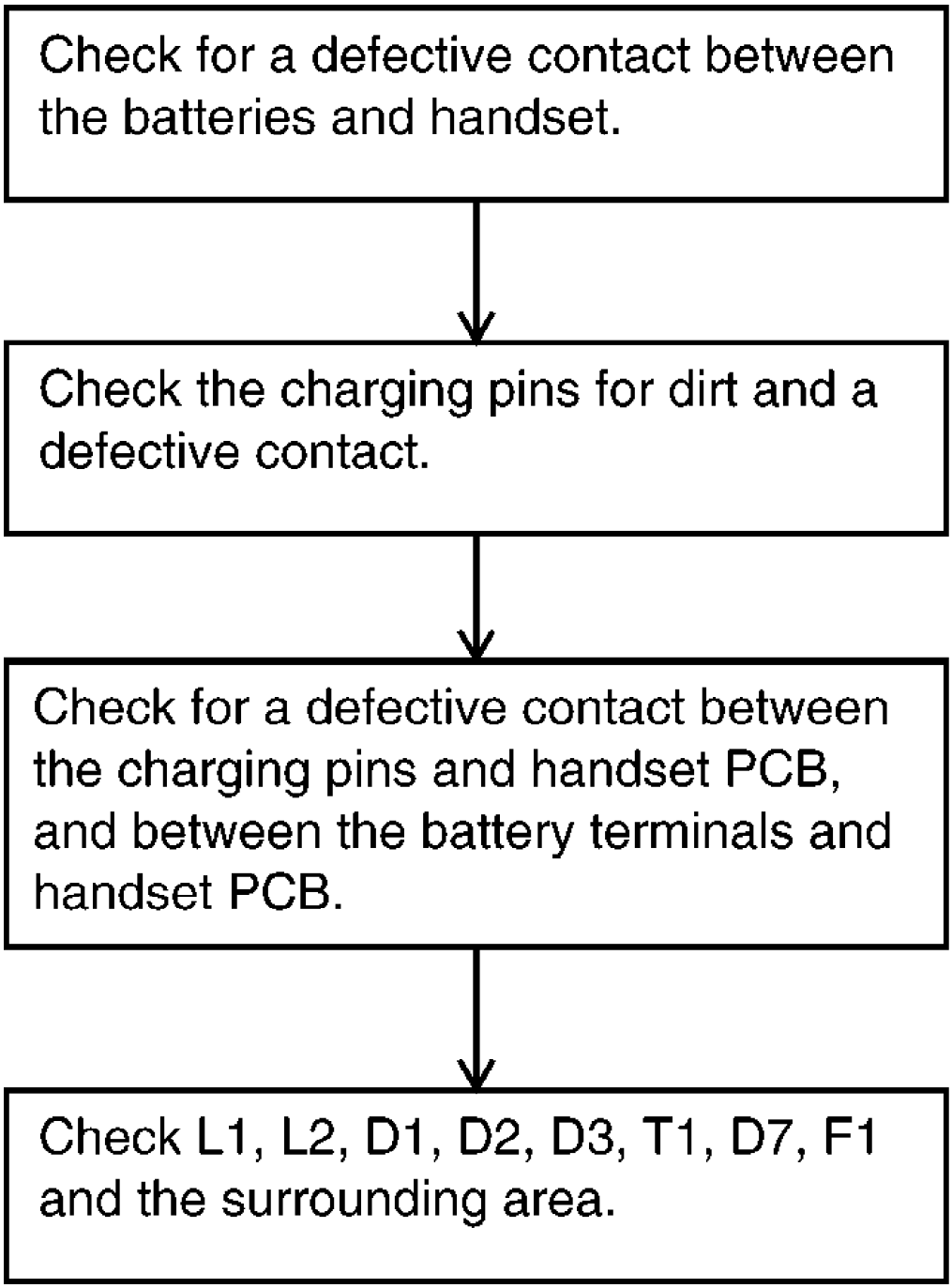
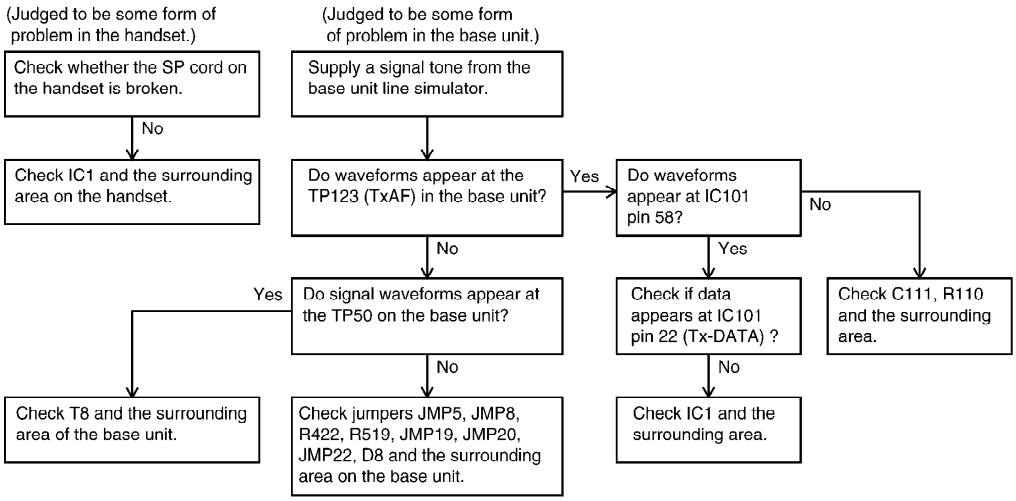


Fig. 31

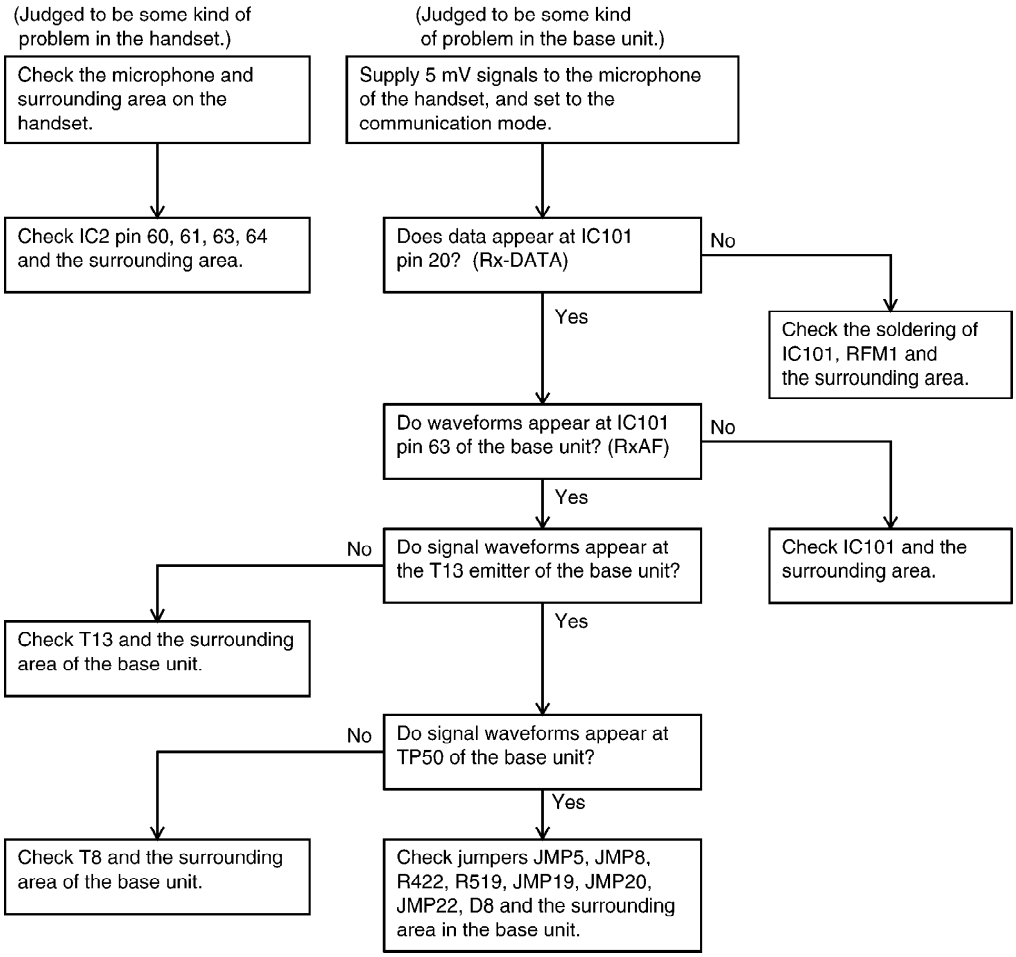
14.5. HANDSET: DOES NOT CHARGE



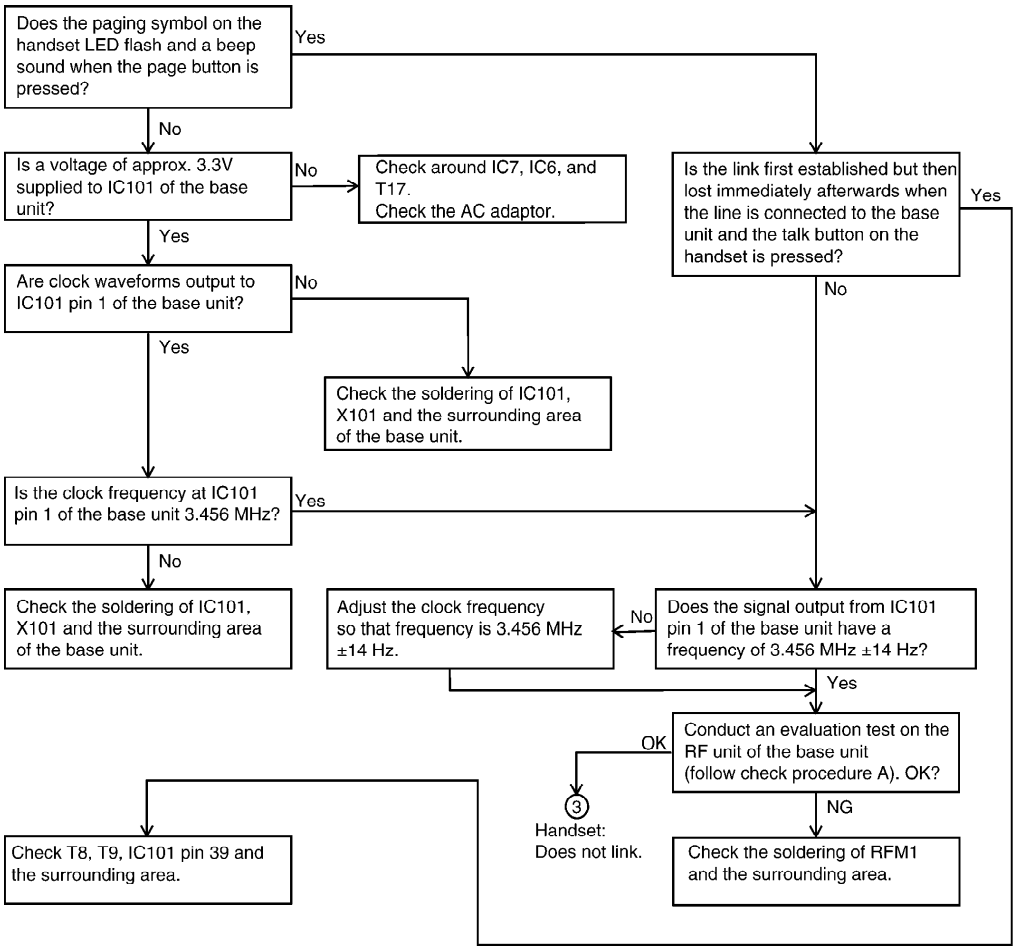
14.6. NO VOICE RECEPTION



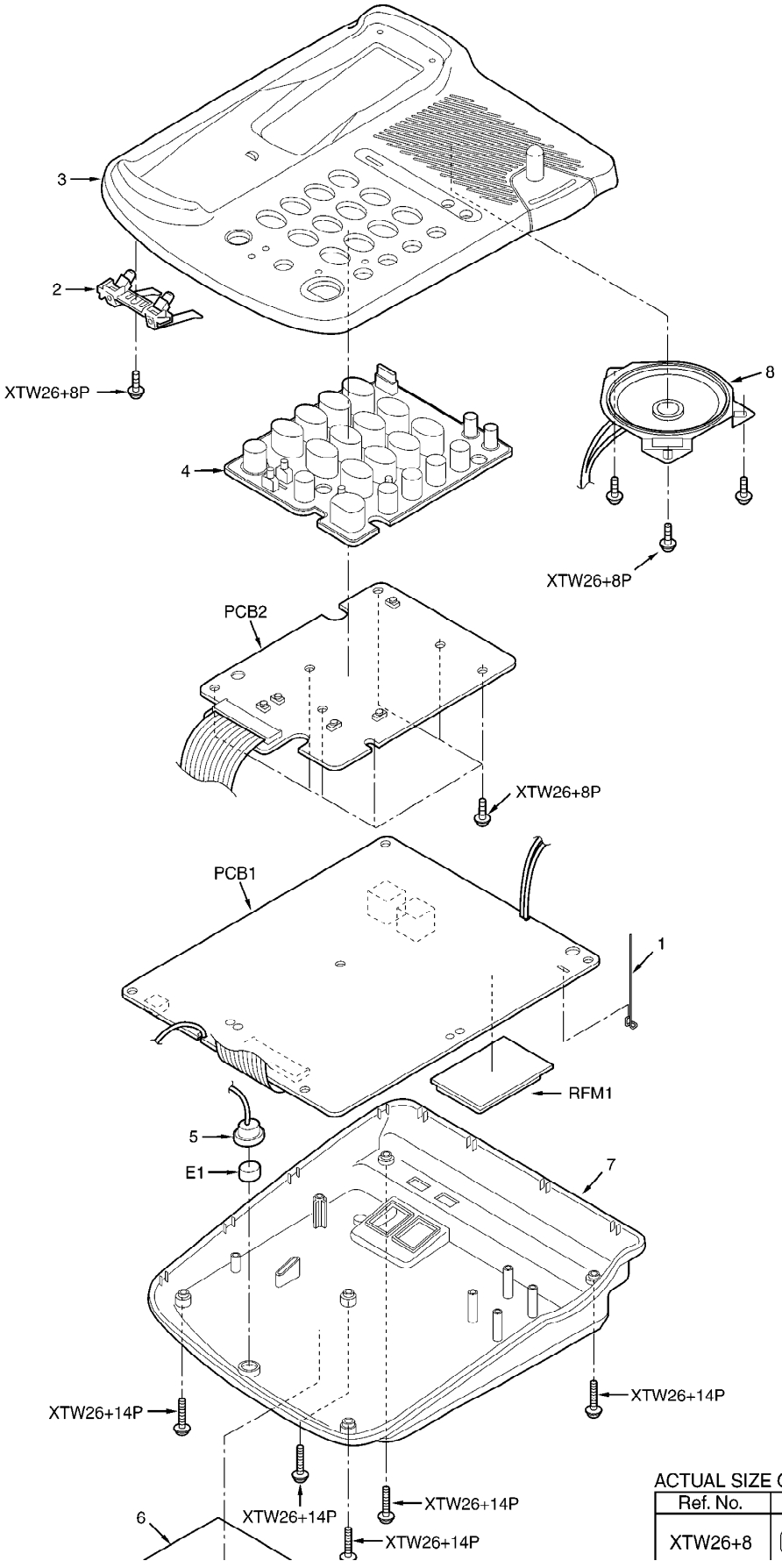
14.7. NO VOICE TRANSMISSION



14.8. BASE UNIT: DOES NOT LINK

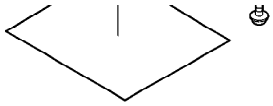


15. CABINET AND ELECTRICAL PARTS LOCATION (BASE UNIT)



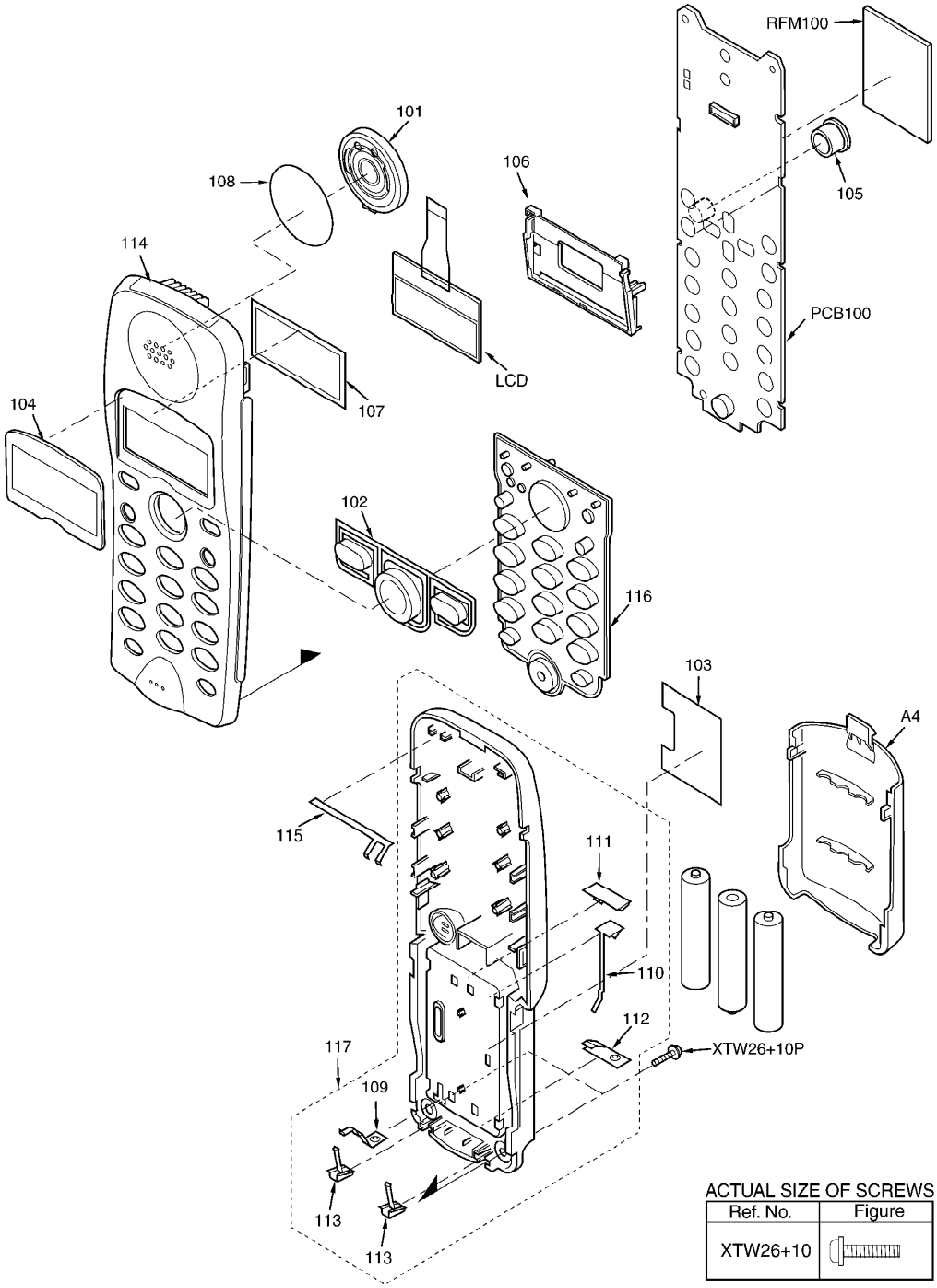
ACTUAL SIZE OF SCREWS

Ref. No.	Figure
XTW26+8	



XTW26+14	

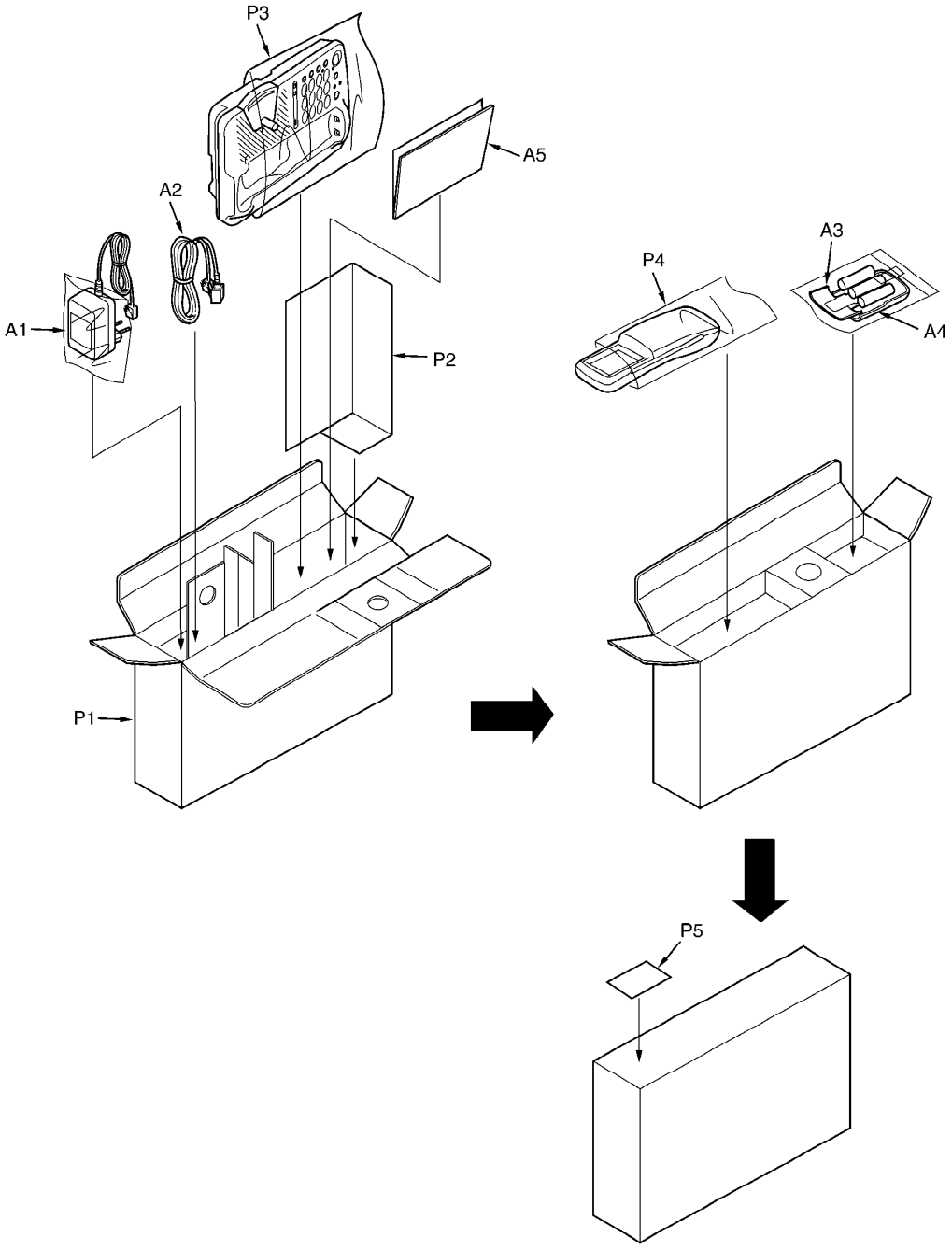
16. CABINET AND ELECTRICAL PARTS LOCATION (HANDSET)



ACTUAL SIZE OF SCREWS

Ref. No.	Figure
XTW26+10	

17. ACCESSORIES AND PACKING MATERIALS



18. REPLACEMENT PARTS LIST

This replacement parts list is for KX-TCD953GRB only.
Refer to the simplified manual (cover) for other areas.
Notes:

1. The marking (RTL) indicates that the Retention Time is limited for this item.
After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of

assembly, and in accordance with the laws governing parts and product retention.
After the end of this period, the assembly will no longer be available.

2. **Important safety notice / Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacture's specified parts.**
3. **The S mark indicates service standard parts and may differ from production parts.**
4. **RESISTORS & CAPACITORS / Unless otherwise specified; / All resistors are in ohms (Ω) K=1000 Ω , M=1000k Ω / All capacitors are in MICRO FARADS (μ F) P= μ μ F / *Type & Wattage of Resistor**

Type

ERC:Solid ERD:Carbon PQ4R:Chip	ERX:Metal Film ERG:Metal Oxide ERO:Metal Film	PQRD:Carbon PQRQ:Fuse ERF:Wire Wound

Wattege

10,16,18:1/8W	14,25,S2:1/4W	12,50,S1:1/2W	1:1W	2:2W	5:5W

ECFD:Semi-Conductor ECQS:Styrol PQCBX,ECUV:Chip ECMS:Mica	ECCD,ECKD,PQCBC,PQVP : Ceramic ECQM,ECQV,ECQE,ECQU,ECQB : Polyester ECEA,ECSZ,ECOS : Electrolytic ECQP : Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H : 50V 2A : 100V 2E : 250V 2H : 500V	05 : 50V 1 : 100V 2 : 200V	OF : 3.15V 1A : 10V 1V : 35V OJ : 6.3V	OJ : 6.3V 1A : 10V 1C : 16V 1E,25 : 25V	1V : 35V 50,1H : 50V 1J : 63V 2A : 100V

18.1. Base Unit

18.1.1. CABINET AND ELECTRICAL PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
1	PQSA10078Z	ANTENNA	
2	PQJT10165Z	CHARGE TERMINAL	
3	PQKM10427Z1	UPPER CABINET	S
4	PQSX10135Z	RUBBER SWITCH	
5	PQMG10020Z	RUBBER	
6	PQGT14245Z	NAME PLATE	
7	PQYF10151Z1	LOWER CABINET	S
8	PQAS57P03Z	SPEAKER	

18.1.2. MAIN P.C.BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PQWP1D953GRH	MAIN P. C. BOARD ASS'Y (RTL)	
		(ICS)	
IC3	PQVILM392M	IC	
IC4	PQVILMV321M5	IC	
IC5	PQVILM1117MP	IC	
IC7	PQVILM1117MP	IC	
IC8	PQVIP7LC541P	IC	
IC9	PQVIP7LC573P	IC	
IC10	PQVIMS77171M	IC	
IC11	PQVILP295133	IC	
IC14	PQVIMC34119M	IC	S
IC101	PQVINS14424V	IC	
IC102	PQWICD953GRH	IC	
IC103	PQVIT2432WM6	IC	
		(TRANSISTORS)	
T3	2SA1037K	TRANSISTOR(SI)	
T5	PQVTBCP5216T	TRANSISTOR(SI)	S
T8	2SA1807NT	TRANSISTOR(SI)	
T9	PQVTBF822T7	TRANSISTOR(SI)	
T11	PQVTBC847BT1	TRANSISTOR(SI)	
T13	2SD1994A	TRANSISTOR(SI)	
T14	2SD601A	TRANSISTOR(SI)	
T15	2SD1664Q	TRANSISTOR(SI)	
T16	2SB709A	TRANSISTOR(SI)	
		(DIODES)	
D2	PQVDBZV55C02	DIODE(SI)	
D3	PQVDBZV55C02	DIODE(SI)	
D4	MA110	DIODE(SI)	
D8	PQVDS1ZB60F1	DIODE(SI)	
D10	MA1Z300	DIODE(SI)	
D11	MA112	DIODE(SI)	
D13	MA8180	DIODE(SI)	
D104	PQVDHVU359	DIODE(SI)	
D105	MA8047	DIODE(SI)	
		(COILS)	
L1	ELEAV102KA	COIL	
L2	ELEAV102KA	COIL	
		(VARISTORS)	
D6	PQVDDAN217	VARISTOR	
D7	PQVDDAN217	VARISTOR	

Ref. No.	Part No.	Part Name & Description	Remarks
SA3	PQVDDSS301L	VARISTOR	
SA4	PQVDDSP302MR	VARISTOR	
		(JACKS)	
J1	PQJJ1T018Z	JACK/SOCKET	
J2	PQJJ1T019Z	JACK/SOCKET	
		(CRYSTAL OSCILLATORS)	
X101	PQVCF1036N4Z	CRYSTAL OSCILLATOR	
		(CONNECTORS)	
J3	PQJS25A19Z	CONNECTOR	
J5	PQJP02A85Z	CONNECTOR	
		(PHOTO ELECTRIC TRANSDUCERS)	
IC2	PQVIPC357CN	PHOTO ELECTRIC TRANSDUCER	
IC6	PQVIPC357CN	PHOTO ELECTRIC TRANSDUCER	
		(OTHERS)	
E1	PQJM146Z	MICROPHONE	
E2	WBH2AW-15AAY	LEAD WIRE (SPEAKER)	
		(RESISTORS)	
R3	PQ4R18XJ472	4.7K	
R4	ERJ3GEYJ103	10K	
R9	PQ4R10XJ224	220K	
R10	ERJ3GEYJ104	100K	
R11	PQ4R10XJ224	220K	
R12	ERJ3GEYJ104	100K	
R13	ERJ3GEYJ223	22K	
R14	ERJ3GEYJ223	22K	
R15	ERJ3GEYJ104	100K	
R16	ERJ3GEYJ103	10K	
R17	ERJ3GEYJ155	1.5M	
R18	ERJ3GEYJ103	10K	
R19	PQ4R10XJ474	470K	
R20	ERJ3GEYJ333	33K	
R21	PQ4R10XJ474	470K	
R22	ERJ3GEYJ333	33K	
R28	ERJ3GEYJ470	47	
R29	ERJ3GEYJ470	47	
R31	ERJ3EKF13R0	13	
R32	PQ4R18XJ562	5.6K	
R33	ERJ1WY152	1.5K	

Ref. No.	Part No.	Part Name & Description	Remarks
R34	ERJ1WY152	1.5K	
R35	ERJ3GEYJ104	100K	
R36	PQ4R18XJ272	2.7K	
R37	ERJ3GEYJ102	1K	
R38	ERJ3GEYJ103	10K	
R39	ERJ3GEYJ103	10K	
R40	ERJ3GEYJ222	2.2K	
R41	ERJ3GEYJ333	33K	
R42	ERJ3GEYJ391	390	
R43	ERJ3GEYJ560	56	
R44	ERJ3GEYJ391	390	
R45	ERJ3GEYJ472	4.7K	
R46	ERJ3GEYJ122	1.2K	
R49	ERJ3GEYJ222	2.2K	
R50	ERJ3GEYJ2R2	2.2	
R51	ERJ3GEYJ103	10K	
R52	ERJ3GEYJ103	10K	
R53	ERJ3GEYJ103	10K	
R54	ERJ3GEYJ183	18K	
R55	ERJ3GEYJ104	100K	
R56	ERJ12YJ560	56	
R57	ERJ12YJ220	22	
R59	ERJ3GEYJ391	390	
R60	ERJ3GEYJ102	1K	
R61	ERJ3GEYJ102	1K	
R62	ERJ3GEYJ101	100	
R63	PQ4R10XJ8R2	8.2	
R64	PQ4R10XJ1R5	1.5	
R65	ERJ3GEYJ101	100	
R66	PQ4R10XJ122	1.2K	
R67	ERJ3GEYJ122	1.2K	
R68	ERJ3GEYJ272	2.7K	
R69	ERJ3GEYJ224	220K	
R70	ERJ3GEYJ562	5.6K	
R71	ERJ3GEYJ103	10K	
R72	PQ4R10XJ100	10	
R73	ERJ3GEYJ103	10K	
R74	ERJ3GEYJ222	2.2K	
R75	ERJ3GEYJ103	10K	
R76	ERJ3GEYJ103	10K	
R77	ERJ3GEYJ391	390	
R78	ERJ3GEYJ391	390	
R79	ERJ3GEYJ391	390	
R80	ERJ3GEYJ103	10K	
R81	ERJ3GEYJ472	4.7K	
R82	ERJ3GEYJ101	100	
R83	ERJ3GEYJ101	100	
R84	ERJ3GEYJ224	220K	
R85	ERJ3GEYJ224	220K	

Ref. No.	Part No.	Part Name & Description	Remarks
R86	ERJ3GEYJ103	10K	
R87	ERJ3GEYJ153	15K	
R88	ERJ3GEYJ153	15K	
R89	ERJ3GEYJ222	2.2K	
R90	ERJ3GEYJ222	2.2K	
R91	ERJ3GEYJ123	12K	
R93	ERJ3EKF1003	100K	
R94	ERJ3GEYJ104	100K	
R95	ERJ3EKF6492	64.9K	
R96	ERJ3GEYJ100	10	
R97	ERJ3GEYJ103	10K	
R105	ERJ3GEYJ105	1M	
R106	ERJ3GEYJ105	1M	
R107	ERJ3GEYJ101	100	
R108	ERJ3GEYJ560	56	
R110	ERJ3GEYJ101	100	
R111	ERJ3GEYJ101	100	
R115	ERJ3GEYJ100	10	
R116	ERJ3GEYJ102	1K	
R117	ERJ3GEYJ101	100	
R118	ERJ3GEYJ103	10K	
R119	ERJ3GEYJ103	10K	
R120	ERJ3GEYJ103	10K	
R121	ERJ3GEYJ222	2.2K	
JMP3	PQ4R10XJ000	0	
JMP5	EYF6CU	0	
JMP8	EYF6CU	0	
JMP9	PQ4R10XJ000	0	
JMP18	PQ4R18XJ000	0	
JMP22	PQ4R10XJ000	0	
JMP202	ERJ3GEY0R00	0	
JMP206	ERJ3GEY0R00	0	
JMP207	ERJ3GEY0R00	0	
L4	ERJ3GEY0R00	0	
		(CAPACITORS)	
C1	ECUV1C104KBV	0.1	
C2	ECQE2E474KZ	0.47	S
C6	ECUV2H470JC	47P	
C7	ECUV1H390JCV	39P	
C8	ECUV2H470JC	47P	
C10	ECST1CY105	1	
C11	ECUV1H101JCV	100P	
C12	ECUV2H102KB	0.001	

Ref. No.	Part No.	Part Name & Description	Remarks
C13	ECUV1H152KBV	0.0015	
C14	ECUV2H102KB	0.001	
C15	ECUV1H152KBV	0.0015	
C16	ECUV2H681KB	680P	
C17	ECUV2H681KB	680P	
C18	ECUV2H681KB	680P	
C21	ECEA1HKS100	10	
C22	ECUV1H103KBV	0.01	
C23	ECUV1H332J	0.0033	
C27	ECUV1H472KBV	0.0047	
C28	PQCUV1C224KB	0.22	
C30	ECUV1H100DCV	10P	
C31	ECUV1H100DCV	10P	
C34	PQCUV1C154KB	0.15	
C36	ECEA1HKS2R2	2.2	
C38	ECUV1H103KBV	0.01	
C39	ECUV1C105KB	1	
C40	ECEA1CK101	100	S
C41	ECUV1H100DCV	10P	
C42	ECEA1AKA101	100	
C43	PQCUV1C224KB	0.22	
C44	ECUV1H100DCV	10P	
C45	ECEA1AKS221	220	
C46	ECUV1H100DCV	10P	
C47	ECUV1A225KB	2.2	
C48	ECST1CY105	1	
C49	ECEA1AKA101	100	
C50	ECUV1H100DCV	10P	
C51	ECUV1H100DCV	10P	
C53	ECUV1H330JCV	33P	
C54	ECUV1H100DCV	10P	
C55	ECUV1A105KB	1	
C56	ECUV1H101JCV	100P	
C57	ECUV1C104KBV	0.1	
C58	ECUV1C104KBV	0.1	
C59	ECUV1C104KBV	0.1	
C60	ECUV1C104KBV	0.1	
C61	ECUV1C104KBV	0.1	
C62	ECUV1E333KBV	0.033	
C63	ECUV1E333KBV	0.033	
C64	ECUV1C104KBV	0.1	
C65	ECST1AY475	4.7	
C66	ECST1AY475	4.7	
C69	ECUV1H100DCV	10P	
C70	ECUV1H100DCV	10P	
C71	ECUV1H100DCV	10P	
C72	ECUV1H100DCV	10P	
C73	ECUV1H100DCV	10P	

Ref. No.	Part No.	Part Name & Description	Remarks
C74	ECUV1H100DCV	10P	
C75	ECUV1H100DCV	10P	
C76	ECUV1H100DCV	10P	
C77	ECST0GY106	10	
C78	ECEA1CK101	100	S
C79	ECST1AY475	4.7	
C80	ECUV1H220JCV	22P	
C81	ECUV1H220JCV	22P	
C82	ECST1CY105	1	
C83	ECEA1CK101	100	S
C84	ECUV1H100DCV	10P	
C85	ECUV1H100DCV	10P	
C86	ECUV1H100DCV	10P	
C87	ECUV1A105KB	1	
C88	ECUV1A105KB	1	
C89	ECUV1H100DCV	10P	
C90	ECUV1H100DCV	10P	
C91	ECUV1H103KBV	0.01	
C92	ECUV1H100DCV	10P	
C93	ECST1AY106	10	
C94	ECUV1H100DCV	10P	
C95	ECUV1H100DCV	10P	
C96	ECUV1H100DCV	10P	
C97	ECUV1H100DCV	10P	
C98	ECUV1H100DCV	10P	
C99	ECUV1H100DCV	10P	
C100	ECUV1H100DCV	10P	
C101	ECUV1H100DCV	10P	
C102	ECUV1H103KBV	0.01	
C103	ECUV1H102KBV	0.001	
C104	ECUV1H680JCV	68P	
C105	ECUV1H680JCV	68P	
C106	PQCUV1C224KB	0.22	
C107	ECST1CY105	1	
C108	ECUV1H100DCV	10P	
C109	ECUV1C224KBV	0.22	
C110	ECUV1H100DCV	10P	
C111	ECUV1C104KBV	0.1	
C112	ECUV1H100DCV	10P	
C113	ECUV1C104KBV	0.1	
C114	ECUV1H100DCV	10P	
C115	ECUV1H100DCV	10P	
C116	ECST0GY106	10	
C117	ECUV1H100DCV	10P	
C118	ECUV1H100DCV	10P	
C119	ECUV1H100DCV	10P	
C120	ECUV1H100DCV	10P	
C121	ECUV1A105KB	1	
C123	ECUV1H100DCV	10P	

Ref. No.	Part No.	Part Name & Description	Remarks
C124	ECUV1H100DCV	10P	
C125	ECUV1H100DCV	10P	
C126	ECUV1H100DCV	10P	
C127	ECUV1H100DCV	10P	
C128	ECUV1H100DCV	10P	
C129	ECUV1H100DCV	10P	
C139	ECUV1C104KBV	0.1	
C140	ECUV1C104KBV	0.1	
C141	ECUV1C104KBV	0.1	
C142	ECUV1C104KBV	0.1	
C143	ECUV1C104KBV	0.1	
C144	ECUV1C104KBV	0.1	
C145	ECUV1C104KBV	0.1	
C146	ECUV1H101JCV	100P	
		(RF UNIT PART)	
RFM1	PQLZ10014Z	RF BLOCK	

18.1.3. OPERATIONAL P. C. BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PQWP2D953CEH	P. C. BOARD ASS'Y (RTL)	
		(LEDS)	
D1	LNJ801LPDJA	LED	
D2	LNJ801LPDJA	LED	
D14	LNJ301MPUJA	LED	
D15	LNJ301MPUJA	LED	
D16	LNJ801LPDJA	LED	
		(CONNECTOR)	
J1	PQJS25A19Z	CONNECTOR	
		(OTHERS)	
E3	PQHX10968Z	COVER	
E4	PQJE10095Z	LEAD WIRE	

18.2. Handset

18.2.1. CABINET AND ELECTRICAL PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
101	PQAX3P26Z	SPEAKER	
102	PQBX10324Z1	FUNCTION BUTTON	S
103	PQGT14109Z	NAME PLATE	
104	PQGP10145Z1	LCD PANEL	S
105	PQHG10486Z	RINGER RUBBER	
106	PQHR10649Y	LCD HOLDER	
107	PQHR10651Z	LCD SPONGE	
108	PQHS10342Z	SPEAKER NET	
109	PQJC10035Z	BATTERY TERMINAL	
110	PQJC10036Z	BATTERY TERMINAL	
111	PQJC10037Z	BATTERY TERMINAL	
112	PQJC904Y	BATTERY TERMINAL	
113	PQJT10143Z	BATTERY TERMINAL	
114	PQKM10370X1	FRONT CABINET	S
115	PQSA10085Z	ANTENNA	
116	PQSX10100Z	RUBBER KEYPAD	
117	PQYF10149Y1	REAR CABINET	S

18.2.2. MAIN P.C.BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB100	PQWPCD952GRA	MAIN P. C. BOARD ASS'Y (RTL)	
		(ICS)	
IC1	PQWICD952GRA	IC	
		(TRANSISTORS)	
T1	PQVTBC80825T	TRANSISTOR(SI)	S
T2	UN521	TRANSISTOR(SI)	S
T3	PQVTBC80825T	TRANSISTOR(SI)	S
T5	PQVTBC81825T	TRANSISTOR(SI)	S
		(DIODES)	
D1	PQVDBYD17D	DIODE(SI)	
D2	PQVDBZD27C18	DIODE(SI)	S
D3	MA112	DIODE(SI)	
D4	PQVDBZD27C18	DIODE(SI)	S
D5	MA112	DIODE(SI)	
D6	PQVDBZD27C56	DIODE(SI)	S
D7	PQVDHRU0203A	DIODE(SI)	S
D11	MA110	DIODE(SI)	
D12	PQVDHVU359	DIODE(SI)	
D13	MA8047	DIODE(SI)	
		(COILS)	
L1	ELJPA100KF	COIL	
L2	ELJPA100KF	COIL	

Ref. No.	Part No.	Part Name & Description	Remarks
F1	PQLQR2M5N6K	COIL	
		(OTHERS)	
LCD	PQADS404HB	LIQUID CRYSTAL DISPLAY	
A101(+)	PQJT10152Y	ANTENNA	
A101(-)	PQJT10152Y	ANTENNA	
BZ1	PQEFBC12111B	BUZZER	S
J1	PQJT10090Z	BATTERY TERMINAL	S
J2	PQJT10090Z	BATTERY TERMINAL	S
J3	PQJT10090Z	BATTERY TERMINAL	S
J4	PQJT10090Z	BATTERY TERMINAL	S
M1	PQJM146Z	MICROPHONE	
X1	PQVCF1036N3Z	CRYSTAL OSCILLATOR	
J9	PQJS30B11Z	CONNECTOR	
LS2(+)	PQJT10161Z	SPEAKER TERMINAL	
LS2(-)	PQJT10161Z	SPEAKER TERMINAL	
		(RESISTORS)	
R1	ERJ3GEYJ103	10k	
R2	PQ4R10XJ122	1.2k	
R3	PQ4R18XJ471	470	
R4	ERJ3GEYJ682	6.8k	
R5	ERJ3GEYJ103	10k	
R6	ERJ3GEYJ153	15k	
R7	ERJ3GEYJ104	100k	
R14	ERJ3GEYJ563	56k	
R15	ERJ3GEYJ104	100k	
R16	ERJ3GEYJ563	56k	
R17	ERJ3GEYJ104	100k	
R18	ERJ3GEYJ102	1k	
R19	ERJ3GEYJ102	1k	
R20	ERJ3GEYJ105	1M	
R21	ERJ3GEYJ105	1M	
R22	ERJ3GEYJ100	10	
R23	ERJ3GEYJ100	10	
R24	ERJ3GEYJ101	100	
R25	ERJ3GEYJ101	100	
R27	ERJ3GEYJ101	100	
R28	ERJ3GEYJ101	100	
R29	ERJ3GEYJ471	470	
R30	ERJ3GEYJ471	470	
R31	ERJ3GEYJ102	1k	

Ref. No.	Part No.	Part Name & Description	Remarks
R32	ERJ3GEYJ102	1k	
R33	ERJ3GEYJ822	8.2k	
R34	ERJ3GEYJ332	3.3k	
R35	ERJ3GEYJ1R0	1	
R36	ERJ3GEYJ100	10	
R37	ERJ3GEYJ102	1k	
R38	ERJ3GEYJ101	100	
R44	ERJ3GEYJ103	10k	
R47	ERJ3GEYJ103	10k	
R48	ERJ3GEYJ103	10k	
R49	ERJ3GEYJ104	100k	
R50	ERJ3GEYJ563	56k	
R51	ERJ3GEYJ104	100k	
C56	ERJ3GEYJ332	3.3k	
		(CAPACITORS)	
C1	PQCUV1E104MD	0.1	
C2	ECUV1C104KBV	0.1	
C3	ECEV1AA101	100	
C4	ECUV1H100DCV	10P	
C5	PQCUV1C224KB	0.22	
C6	ECUV1H100DCV	10P	
C7	PQCUV1C105ZF	1	
C9	ECUV1C104KBV	0.1	
C10	ECUV1H100DCV	10P	
C11	ECUV1H103KBV	0.01	
C12	ECUV1H102KBV	0.001	
C13	ECUV1H390JCV	39P	
C14	ECUV1H390JCV	39P	
C15	ECUV1H100DCV	10P	
C16	ECUV1H100DCV	10P	
C17	ECUV1H100DCV	10P	
C18	ECUV1H100DCV	10P	
C19	PQCUV1A105KB	1	
C20	ECUV1H100DCV	10P	
C22	ECUV1H472KBV	0.0047	
C23	ECUV1H472KBV	0.0047	
C24	PQCUV1H563KB	0.056	
C25	ECUV1H100DCV	10P	
C26	ECUV1H100DCV	10P	
C27	PQCUV1C105ZF	1	
C28	ECST0JY106	10	
C29	PQCUV1C105ZF	1	
C30	ECST0JY106	10	
C35	ECUV1H102KBV	0.001	
C37	PQCUV1H681JC	680P	
C47	PQCUV1C224KB	0.22	

Ref. No.	Part No.	Part Name & Description	Remarks
C48	ECUV1H100DCV	10P	
C50	ECUV1C104KBV	0.1	
C51	ECUV1C104KBV	0.1	
C52	ECUV1C104KBV	0.1	
C53	ECUV1C104KBV	0.1	
C54	ECUV1C104KBV	0.1	
C55	ECUV1C104KBV	0.1	
C65	ECUV1H100DCV	10P	
C66	ECUV1H100DCV	10P	
C67	ECUV1H100DCV	10P	
C68	ECUV1H100DCV	10P	
C71	ECUV1C104KBV	0.1	
C72	PQ4R10XJ000	0	
C73	ECUV1H101JCV	100P	
C74	PQCUV1H102J	0.001	S
C75	PQCUV1H102J	0.001	S
C77	ECUV1H100DCV	10P	
RF UNIT PARTS			
RFM100	PQLZ10007Z	RF BLOCK	

18.2.3. ACCESSORIES AND PACKING MATERIALS

Ref. No.	Part No.	Part Name & Description	Remarks
A1	KX-TCA11CE	AC ADAPTOR	
A2	PQJA10095Z	TEL CORD	
A3	PQKE10071Z1	BELT CLIP	S
A4	PQKK10091Z1	BATTERY COVER	S
A5	PQQX12750Z	INSTRUCTION BOOK	
P1	PQPK13031Z	GIFT BOX	
P2	PQPD10443Z	CUSHION	
P3	PQPP10085Z	PROTECTION COVER(for Base Unit)	
P4	PQPP10084Z	PROTECTION COVER (for Handset)	
P5	PQGT14245Z	NAME PLATE	

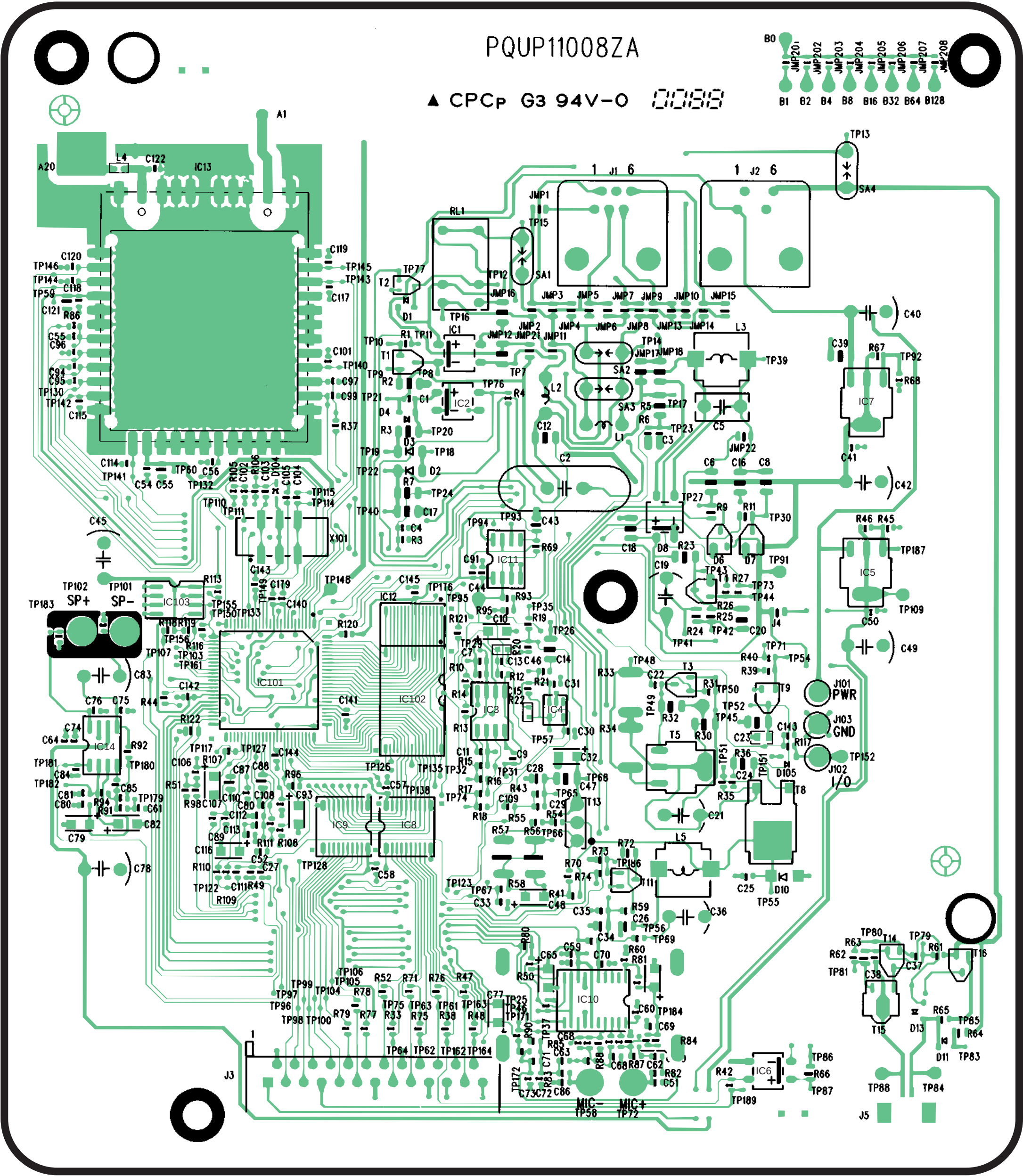
18.3. MEMO

19. CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM

19.1. BASE UNIT

19.1.1. Component View

19.1.2. Flow Solder Side View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▲ CPCp G3 94V-0
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IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
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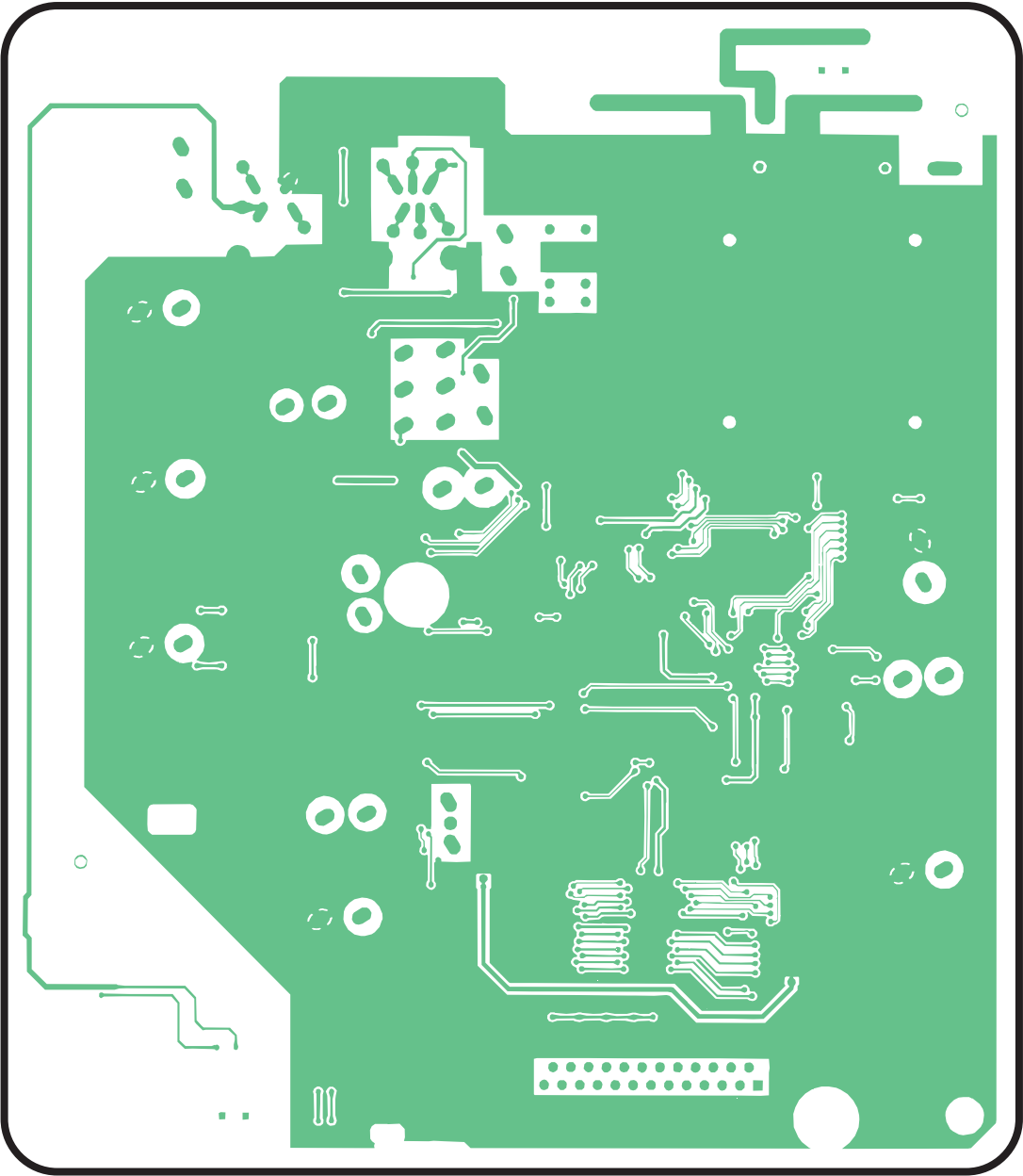
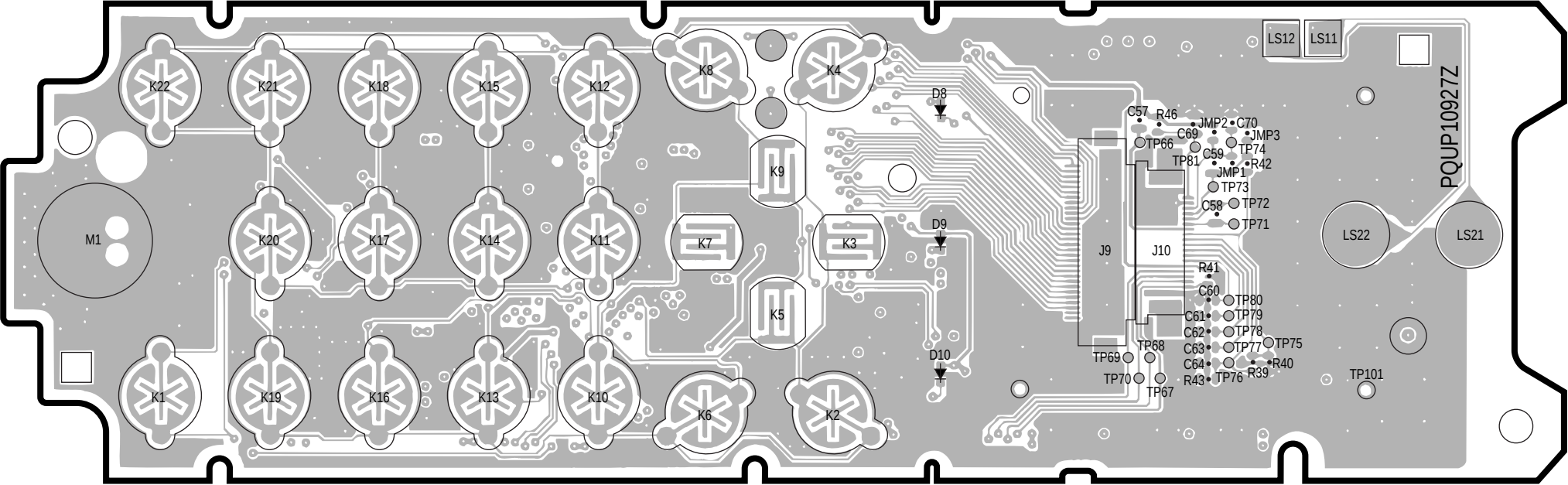
IC12
IC13
IC14
IC101
IC102
IC103
J1
J2
J3
J5
RL1
SA1
SA2
SA3
SA4
L1
L2
L3
L4
L5
X101
J101 PWR
J103 GND
J102 I/O
SP+
SP−
MIC−
MIC+
A1
A20

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K15
K12
K8
K4
K20
K17
K14
K11
K9
K7
K3
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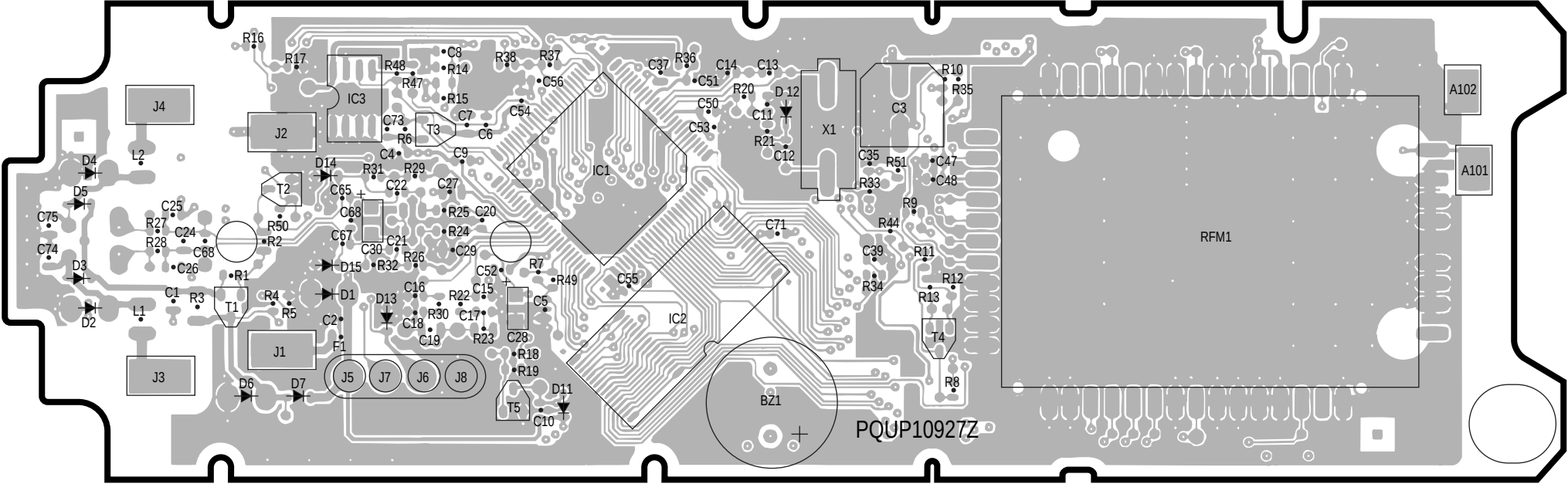
K1
K19
K16
K13
K10
K6
K2
M1
D8
D9
D10
J9
J10
LS12
LS11
LS22
LS21
PQUP10927Z
C57
R46
JMP2
C70
C69
JMP3
TP66
TP74
C59
TP81
R42
JMP1
TP73
C58
TP72
TP71
R41
C60
TP80
C61
TP79
C62
TP78
C63
TP77
TP75
C64
R40
R43
TP76
R39
TP69
TP68
TP70
TP67
TP101


R16
R17
R48
R47
C8
R14
R15
R38
R37
C56
C54
C73
T3
C7
C6
R6
C4
C9
IC3
J4
J2
L2
D4
D5
C75
C74
D3
D2
L1
C25
R27
R28
C24
C68
C26
R1
C1
R3
T1
R4
R5
J1
J3
F1
C2
D14
R31
R29
C65
C22
C27
T2
R50
R2
C68
C67
C30
C21
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C15
C52
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R49
C5
C28
R18
R19
J5
J7
J6
J8
D6
D7
T5
D11
C10
IC1
C37
R36
C51
C50
C53
C14
C13
R20
D12
C11
R21
C12
X1
C3
R10
R35
C35
R51
C47
C48
R33
R9
R44
C39
R11
R12
R13
R34
T4
R8
C71
C55
IC2
BZ1
RFM1
A102
A101
PQUP10927Z

TP1 TP2 TP3 TP4 TP5 TP6 TP7 TP8 TP9 TP10 TP11 TP12 TP13 TP14 TP15 TP16 TP17 TP18 TP19 TP20 TP21 TP22 TP24 TP23 TP26 TP27 TP28 TP29 TP30 TP31 TP32 TP33 TP34 TP35 TP36 TP38 TP39 TP40 TP41 TP42 TP43 TP44 TP45 TP48 TP49 TP50 TP51 TP52 TP54 TP55 TP56 TP57 TP65 TP66 TP67 TP68 TP69 TP70 TP71 TP73 TP74 TP76 TP77 TP78 TP79 TP80 TP81 TP82 TP83 TP84 TP85 TP86 TP87 TP88 TP89 TP90 TP91 TP92 TP93 TP94 TP95 TP109 TP186 TP187 TP189

J1 J2

JMP1 N.M. JMP2 N.M. JMP3 0Ω JMP4 N.M. JMP5 0Ω JMP6 N.M. JMP7 N.M. JMP8 0Ω JMP9 0Ω JMP10 N.M. JMP11 N.M. JMP12 N.M. JMP13 N.M. JMP14 N.M. JMP15 N.M. JMP16 N.M. JMP17 N.M. JMP18 0Ω JMP21 N.M. JMP22 0Ω

SA1 N.M. SA2 N.M. SA3 SA4 SY-9-K RL1 N.M.

L1 1.0mH L2 1.0mH L3 N.M.

R1 N.M. R2 N.M. R3 4K7 R4 10K R5 N.M. R6 N.M. R7 N.M. R8 N.M. R9 220K R10 100K R11 220K R12 100K R13 22K R14 22K R15 100K R16 10K R17 1M5 R18 10K R19 470K R20 33K R21 470K R22 33K R23 N.M. R24 N.M. R25 N.M. R26 N.M. R27 N.M. R30 N.M. R31 13R 1% R32 5K6 R33 1K5 R34 1K5 R35 100K R36 2K7 R39 10K R40 2K2 R41 33K R42 390R R43 56R R45 4.7K R46 1.2K R49 2K2 R54 18K R55 100K R56 56R R57 22R R58 N.M. R59 390R R60 1K0 R61 1K0 R62 100R R63 8R2 1% R64 1R5 R65 100R R66 1K2 R67 1K2 R68 2K7 N.M. R69 220K R70 5K6 R72 10R R73 10K R74 2K2 R93 100K 1% R95 64K9 1% R122 N.M.

C1 100n C2 470n 250V C3 N.M. C4 N.M. C5 N.M. C6 47p/500V C7 39p C8 47p/500V C9 N.M C10 1u/16V C11 100p C12 1n0/500V C13 1n5 C14 1n0/500V C15 1n5 C16 680p/500V C17 680p/500V C18 680p/500V C19 N.M C20 N.M. C21 10uF/50V C22 10n C23 3n3 C24 N.M. C25 N.M. C26 N.M. C27 4n7 C28 220n C29 N.M. C30 10p C31 10p C32 C33 N.M. C34 150n C35 N.M. C36 2,2uF C37 N.M. C38 10n C39 1u C40 100uF/16V C41 10p C42 100uF/10V C43 220n C44 10p C45 220uF/10V C46 10p C47 2u2 C48 1u/16V C50 10p C91 10n C130 N.M. C328 N.M.

D1 N.M. D2 D3 D4 D6 D7 D8 MA1Z150 D10 D11 D13 18V

T1 N.M. T2 N.M. T3 T4 N.M. T5 T8 T9 T11 T13 T14 T15 T16

IC1 N.M IC2 IC3-A IC3-B IC4 IC5 IC6 IC7 IC11

L5 N.M.

J5 2 pole SMT Right Angle

VUNREG +1.5V +3.2V +4V +6V

FEEDBACK 3.3V SHUTDOWN GND ERROR IN OUT SENSE VIN VOUT ADJ

REV_POL LINE_SENSE PULSE_DIAL RXAF LINE_C TXAF HOOK CLIP_STATE CLIP CHARGE_PULSE RING EARTH RESET CHARGE_LED CHARGE_ON

Positive charge terminal

Negative charge terminal

Country code

B0 — JMP201 N.M. — JMP202 0R0 — JMP203 N.M. — JMP204 N.M. — JMP205 N.M. — JMP206 0R0 — JMP207 0R0 — JMP208 N.M. — B1 B2 B4 B8 B16 B32 B64 B128

IC103 NC SCL SDA VCC A2 A1 A0 GND

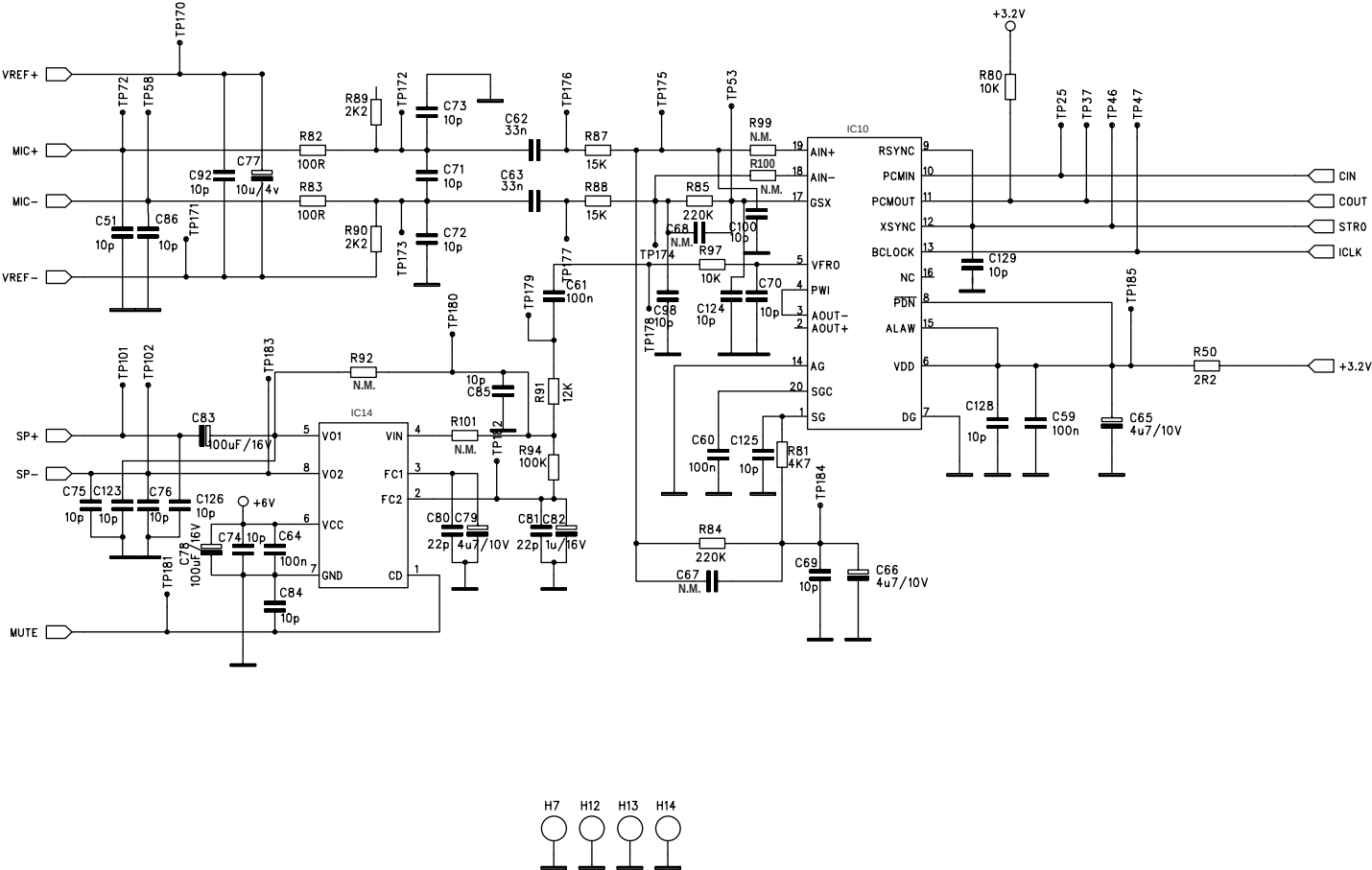
IC101 RST ADC2 P27/ADC1/ HOLDACKN P26/ADC0/DAC0 P25/CIN P24/COUT P23/ICLK P22/PWM P21/STR1 P20/STR0 P17/INT7/ HOLD/MI P16/INT6/ACS P15/INT5/ AD1B P14/INT4/SDO P13/INT3/SDI P12/INT2/SEN P11/INT1/SCK P10/INT0/ P10_INT P07/CLK100 P06/AD1B P05/CS2/READY P04/TONE P03/CS1 P02/CS0 P01/URX P00/UTX RCS WR RD NCO NC1 NC2 NC3

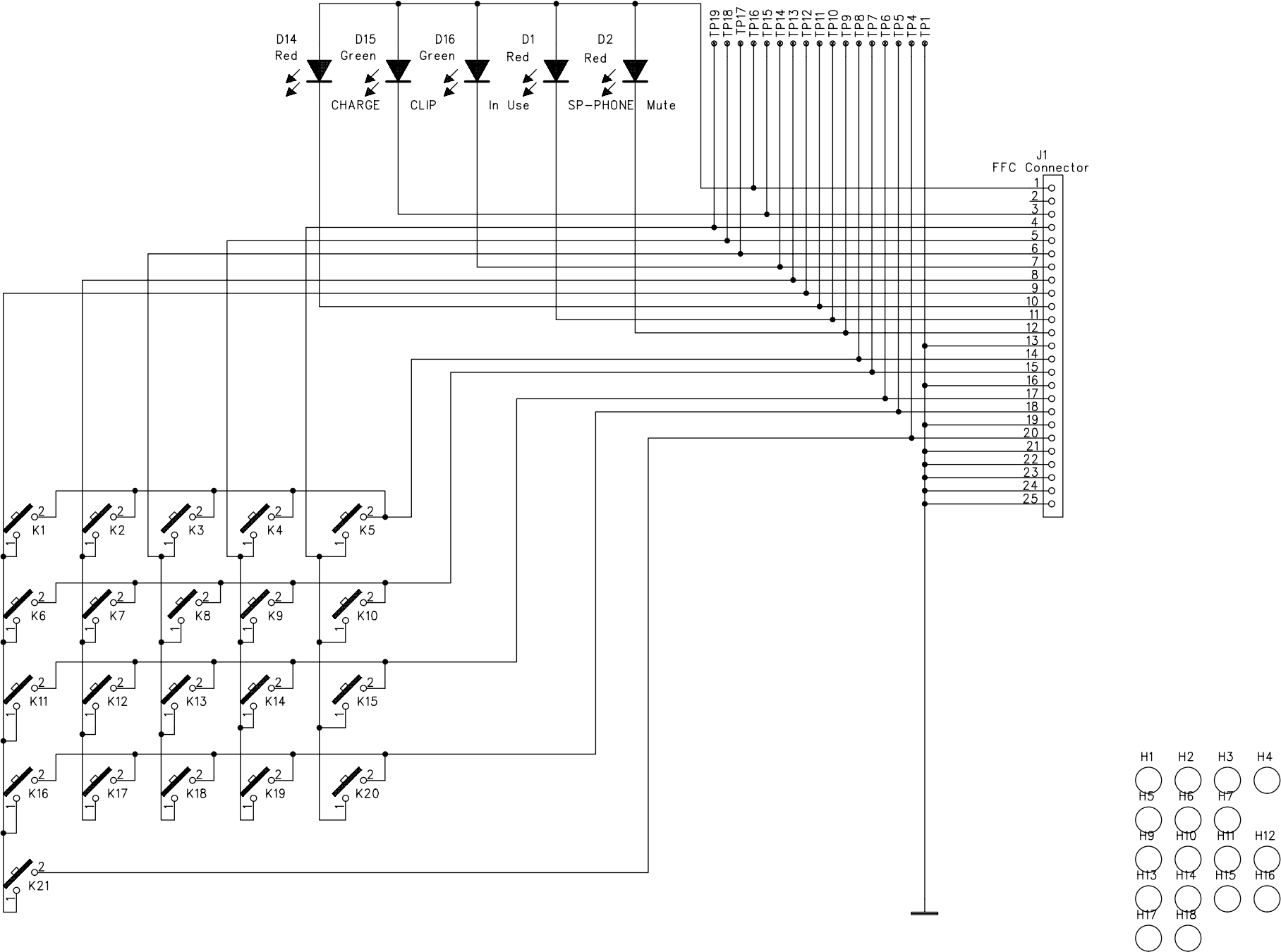
IC13 ALPS DECT RF Modul

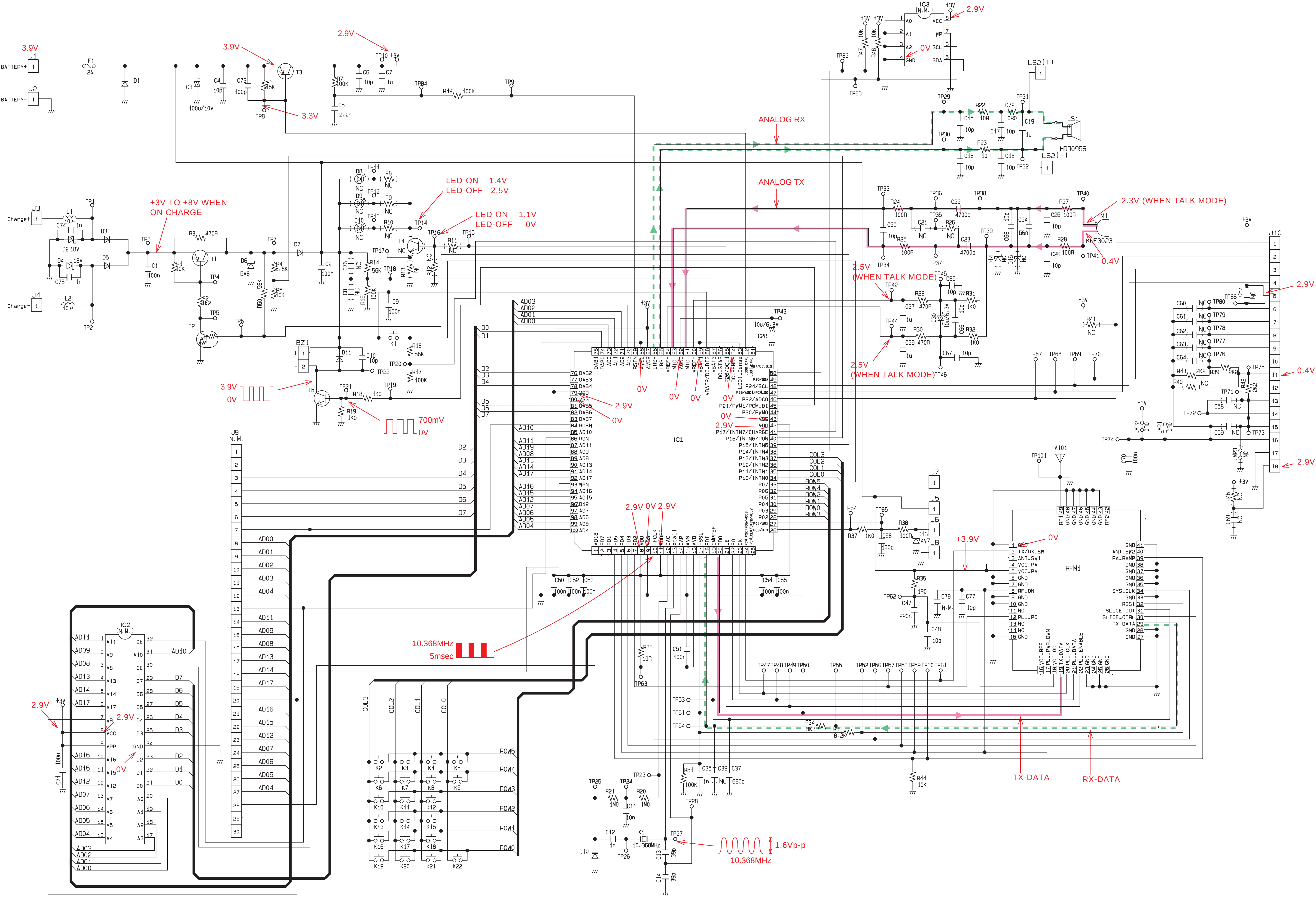
IC8 IC9 IC12 IC102

J3 FFC Connector

A201 Antenna


VREF+
MIC+
MIC-
VREF-
SP+
SP-
MUTE
TP170
TP72
TP58
TP171
TP101
TP102
TP183
TP180
TP172
TP173
TP176
TP175
TP53
TP177
TP179
TP174
TP178
TP181
TP182
TP184
TP185
TP25
TP37
TP46
TP47
R89 2K2
R90 2K2
R82 100R
R83 100R
R87 15K
R88 15K
R85 220K
R97 10K
R99 N.M.
R100 N.M.
R80 10K
R92 N.M.
R91 12K
R94 100K
R101 N.M.
R84 220K
R81 4K7
R50 2R2
C73 10p
C71 10p
C72 10p
C62 33n
C63 33n
C77 10u/4v
C92 10p
C51 10p
C86 10p
C61 100n
C68 N.M.
C100 10p
C98 10p
C124 10p
C70 10p
C129 10p
C83 100uF/16V
C85 10p
C60 100n
C125 10p
C75 10p
C123 10p
C76 10p
C126 10p
C74 10p
C64 100n
C78 100uF/16V
C84 10p
C80 22p
C79 4u7/10V
C81 22p
C82 1u/16V
C67 N.M.
C69 10p
C66 4u7/10V
C128 10p
C59 100n
C65 4u7/10V
IC14
VO1
VO2
VCC
GND
VIN
FC1
FC2
CD
+6V
IC10
AIN+
AIN-
GSX
VFRO
PWI
AOUT-
AOUT+
AG
SGC
SG
RSYNC
PCMIN
PCMOUT
XSYNC
BCLOCK
NC
PDN
ALAW
VDD
DG
+3.2V
CIN
COUT
STRO
ICLK
H7
H12
H13
H14


D14
Red
D15
Green
CHARGE
D16
Green
CLIP
D1
Red
In Use
D2
Red
SP-PHONE
Mute
TP19
TP18
TP17
TP16
TP15
TP14
TP13
TP12
TP11
TP10
TP9
TP8
TP7
TP6
TP5
TP4
TP1
J1
FFC Connector
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
K1
K2
K3
K4
K5
K6
K7
K8
K9
K10
K11
K12
K13
K14
K15
K16
K17
K18
K19
K20
K21
H1
H2
H3
H4
H5
H6
H7
H9
H10
H11
H12
H13
H14
H15
H16
H17
H18


BATTERY+
BATTERY-
Charge+
Charge-
+3V TO +8V WHEN ON CHARGE
LED-ON 1.4V
LED-OFF 2.5V
LED-ON 1.1V
LED-OFF 0V
ANALOG RX
ANALOG TX
2.3V (WHEN TALK MODE)
2.5V (WHEN TALK MODE)
10.368MHz
5msec
1.6Vp-p
700mV
TX-DATA
RX-DATA
IC1
IC2 (N.M.)
IC3 (N.M.)
RFM1
HDR0956
KUF3023
LS1
M1
J1
J2
J3
J4
J5
J6
J7
J8
J9 N.M.
J10
BZ1
A101
X1 10.368MHz